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EDISON ELECTRIC INSTITUTE BULLETIN

OCTOBER, 1941

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EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

July, 1941

SOURCE AND DISPOSAL OF ENERGY—MONTH OF JULY

	1941	1940	%
GENERATION* (Net)			
By Fuel Burning Plants	9,837,962,000	7,934,248,000	+24.0
By Water Power Plants	4,387,758,000	4,159,826,000	+ 5.5
Total Generation	**14,225,720,000**	**12,094,074,000**	**+17.6**
Add—Net Imports Over International Boundaries	81,003,000	81,815,000	− 1.0
Less—Company Use	169,753,000	124,085,000	+36.8
Less—Energy Used by Producer	299,978,000	435,566,000	−31.1
Net Energy for Distribution	**13,836,992,000**	**11,616,238,000**	**+19.1**
Losses and Unaccounted for	2,207,838,000	2,005,400,000	+10.1
Sales to Ultimate Customers	**11,629,154,000**	**9,610,838,000**	**+21.0**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of July 31st			
Residential or Domestic	25,516,036	24,521,419	+ 4.1
Rural (Distinct Rural Rates)	958,307	672,298	.....
Commercial or Industrial:			
Small Light and Power	4,280,421	4,237,205	+ 0.8
Large Light and Power	172,991	180,277	
Other Customers	115,940	110,720	.....
Total Ultimate Customers	**31,043,695**	**29,721,919**	**+ 4.4**
KILOWATTHOUR SALES—During Month of July			
Residential or Domestic	1,926,962,000	1,769,059,000	+ 8.9
Rural (Distinct Rural Rates)	283,435,000	261,624,000	+ 8.3
Commercial or Industrial:			
Small Light and Power	2,044,938,000	1,819,230,000	+12.4
Large Light and Power	6,473,780,000	4,907,806,000	+31.9
Street and Highway Lighting	139,612,000	135,910,000	+ 2.7
Other Public Authorities	247,455,000	212,295,000	+16.6
Railways and Railroads:			
Street and Interurban Railways	299,870,000	293,513,000	+ 2.2
Electrified Steam Railroads	172,039,000	150,373,000	+14.4
Interdepartmental	41,063,000	61,028,000	−32.7
Total to Ultimate Customers	**11,629,154,000**	**9,610,838,000**	**+21.0**
Revenue from Ultimate Customers	**$217,685,200**	**$195,546,700**	**+11.3**

RESIDENTIAL OR DOMESTIC SERVICE (Revised Series)

AVERAGE CUSTOMER DATA—For the 12 Months Ended July 31st			
Kilowatthours per Customer	972	931	+ 4.4
Average Annual Bill	$36.74	$36.31	+ 1.2
Revenue per Kilowatthour	3.78¢	3.90¢	− 3.1

* By courtesy of the Federal Power Commission

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 9 OCTOBER, 1941 No. 10

Utility Operating History in First World War

And Possible Parallels in Present Emergency

By R. M. Boykin

Operating Consultant, Ebasco Services Incorporated

A paper presented at the Ebasco Sales Conference, New York, Oct. 21-24

PUBLIC utilities today are facing serious financial and operating problems many of which are similar to those encountered in the First World War period. Perhaps some of these problems can be solved more readily by recalling the course of events in the years 1917 and 1918, noting any similarity to the present course and profiting by adapting to present conditions the successful measures taken at that time.

The musty pages of magazines and newspaper files have been turned and articles published almost a quarter century ago have been reviewed to reveal parallels that might now be drawn from the First World War period, at which time there was no corresponding precedent available.

For purposes of simplicity and brevity this report summarizes, in plain narrative form, the results of this exhaustive survey of old publications. Extensive quotation and examples are not included, in order to keep the length of the memorandum to a minimum; but specific quotations, illustrations and back-up data are available to support the statements herein condensed.

For those who had experience in utility operations during the First World War, memories may be refreshed; while for the younger men who lack such experience there are here set forth some of the conditions then faced which are not unlike those now taking place or about to develop in the present emergency.

Memories of the former crisis probably do not bring back happy recollections, for there were the problems associated with:

—Increased taxation
—Transportation difficulties
—Shortage of labor and supplies
—Soaring prices
—Valuation hearings
—Vexing delays in obtaining increased rates
—Demands by labor for higher wages
—Demands by customers for extensions
—Difficulties in securing funds to carry on

The preparation of this paper will have been worthwhile if those who are now responsible for the welfare of operating utilities will take a leaf from the pages of history and maintain a strong cash balance through persistent savings in operating expenses, by curtailing construction and by placing in effect flexible rate clauses—thus avoiding financial difficulties and long, burdensome and possibly acrimonious hearings.

History

Transportation, Fuel Cost, Quality, Supply

Trade journals published during the First World War were full of interesting articles reviewing the straits of the utilities and others in need of fuel. Coal cars were held on sidings all over the country and utility fuel stocks were reduced to an alarming degree. Real suffering resulted because of the extremely low temperature lasting for many weeks during the winter of 1917-18. Coal was rationed in many states and regulatory authorities issued "lightless" orders applicable to signs, outdoor lighting, etc., in an effort to conserve fuel to the utmost. Companies without long-term fuel commitments had to pay higher prices and in many instances received coal of inferior quality. These conditions resulted in "runaway" increases in operating costs with no relief in sight. There was a shortage of labor to handle the loading and unloading of freight cars and a dearth of ships at ports to receive the goods held in cars contributed to the tie-up of railway rolling stock. Through no fault of the transportation companies, but as a direct result of unrestrained use of the Government's priority privilege and panic buying in fear of shortages of all kinds of goods, the situation became chaotic and brought about an acute car shortage.

The utilities carried their problem to the people through the medium of advertisements, explaining the situation and requesting cooperation in the conservation of electricity. The possibility of Daylight Saving passed from an interesting suggestion to a strong probability and finally came into practice during the spring of 1917.

Scarcity and High Cost of Copper

There was no precedent for the high prices of copper and other materials used by the utilities, as experienced in the war period of 1917-18. The demand for raw materials, even at increased prices has always come about at times of intense industrial activity and today history is repeating itself; however, the price of copper has now been pegged by governmental authority. Copper, 23 years ago, rose to 45c per lb. and there was little to be had at that price. Those who had copper on hand held it for emergency maintenance; extensions of service ceased.

Financing Extensions

Many plans were proposed by utilities and numerous orders were issued by regulatory commissions in connection with financing extensions. It was not considered patriotic to make extensions unless they were essential because materials

were needed to prosecute the war and man-power was required in shipyards, factories and in the army. The cost of money was almost prohibitive and state commissions, fearing insolvency of companies, in many cases required prospective customers desiring extensions to finance the cost. In many instances commissions required the use of iron wire for conductors when extensions were ordered. The difficult financial position of many companies was greatly aggravated because the increased loads necessitated additions to generating and transmission facilities, which required money at a time when money was dear. Companies faced with maturities or finding it necessary to seek loans and those not in strong cash position, were in trouble.

Appeal to Employees

Due to the rapid increase of all costs early in 1917 in the production and distribution of electricity, some companies issued letters to employees explaining the circumstances and urging that diligence be exercised in reducing expenses and in avoiding all forms of waste. The letters made the further point that increase in the cost of materials and operating expenses could not be recouped by the companies by a corresponding advance in the price of electric service. The increase had to be absorbed by the companies through "stoppage of leaks" and the highest effectiveness generally on the part of employees. Suggestions were made and solicited regarding the conservation of man-power, cash and supplies. There was no precedent then to guide the hand of management, but there was a fine response from the employees, both in their duties and in their willingness to accept substantial personal sacrifice cheerfully as part of their share in the country's effort.

Rates and Regulations

Before and during the First World War period the state commissions were concerned mostly with the quality of service and fairness of rates. Today, the powers of state commissions are broader in scope and, when consideration is given to the additional present regulatory powers of the Federal agencies, the joint powers are all-embracing.

Early in the former conflict utility costs began to mount rapidly due to high prices and scarcity of labor and materials, the high cost of fuel and increasing taxes. Due to these factors and the inflexibility of rates, net earnings declined alarmingly.

To relieve the distressed condition drastic reductions were made in operating expenses, but the savings effected were insufficient to stem the tide. Increases in rates had to be sought from the state commissions. At first partial remedies were applied for, such as the discontinuance of discounts for prompt payment of bills for service and the increase of hours of demand in the first and second steps of demand and energy schedules applying to power service. Fuel and power factor clauses were also put in effect in an effort to add flexibility to rates and to increase revenues. Finally increases in rates applying to residence and commercial, as well as industrial power service, were requested, and rightly so, for every single item going into the cost of public service had greatly increased in price. It was naturally very difficult to get rate increases under such circumstances; therefore, few, if any, were approved until some time after the actual war was ended.

Operating Practices

The 1917-18 trade literature contains many suggestions as to economies which might well be put into practice now in reducing the costs of operating utilities. In that day studies were made of the ever-increasing amount of clerical work accumulating in the utilities' offices to determine the volume absolutely essential and how much could be eliminated. The frequency of meter reading and billing, getting rural customers to read meters and sending readings in by postcard as well as having meter readers in sparsely settled areas make collections, were among the routine activities analyzed. The advisability of discontinuing reports of certain kinds, desirable—though not essential—was constantly under scrutiny. Charges to at least cover costs were made for work done on customers' premises. It was urged that repairs to customers' appliances should be made by wiremen or dealers. Load-building sales efforts were discontinued where present loads approached generation and distribution capacity or in localities where feeders were loaded.

The records show that sales of domestic electric appliances advanced tremendously during the war period due to growing scarcity of domestic help and greater income received by wage earners generally. Cash sales of appliances were greater than ever. Down payments were raised and deferred payment periods shortened.

Credits were closely scrutinized and collections for appliance and service accounts were pushed with vigor. In many cases industrial power accounts were collected more frequently than the usual monthly intervals and all accounts receivable were reduced. There was little need for load-building or appliance salesmen and companies reduced forces substantially.

Second-hand line material and obsolete stocks were used up and every opportunity seized to economize in the utilization of such materials. Poles were stubbed or replaced only when absolutely necessary and ingenious hookups were employed to cut down distribution losses and maintain voltage regulation.

Economy in operation was imperative and cash had to be accumulated.

Finances

In 1918 estimates were made of the maturing funded obligations and the cash required for unavoidable extensions during the year. Even though the estimates were based on the assumption that no extensions would be made or financed except those essential to the vigorous prosecution of the war, the total loomed large.

These estimates and other studies indicated that the electric companies were facing a grave situation owing to the government's needs and requirements, to the abnormal prices of labor, supplies and equipment, to the difficulty of retaining trained employees and to the impossibility of satisfactorily financing extensions.

In view of the financial situation, that was rapidly become worse, a committee of the industry submitted a report to the Comptroller of the Treasury on January 8, 1918, and stated that, if the impending "breakdown of the utilities" was to be averted there were four phases of the situation which must be cared for:

Rates must be increased sufficiently to absorb the increased cost of producing the service.

The utilities must be relieved during the period of the war of all non-essential and unproductive requirements, such as paving, undergrounding of wires, duplication and unnecessary extension of service.

Some way must be found to enable the utilities to take care of obligations maturing during the war period.

Assistance must be provided to enable the companies to finance the unavoidable extensions of service made necessary by the nation's war program.

Considering the representations of the industry's committee, the officials of the government in Washington reached the conclusion that the really fundamental solution of the problem lay in a speedy increase in rates to absorb the increased cost of doing business, and that the customary time-consuming procedure look-

ing toward rate increases was utterly inadequate to meet the emergency.

In June, 1918, President Woodrow Wilson recognized the seriousness of the situation and joined the industry in an appeal for relief. His letter to regulatory authorities said:

"It is essential that these utilities should be maintained at their maximum efficiency and that everything reasonably possible should be done with that end in view. I hope that state and local authorities, where they have not already done so, will, when the facts are properly laid before them, respond promptly to the necessities of the situation."

The Parallel and Warning

Transportation and Materials

The mass transportation system today is a vast improvement over 1917-18. There are now more cars, more trucks, thousands of miles of hard-surfaced and improved highways not available in the days of the First World War, which, with larger locomotives, more and better railway equipment generally, constitute a greatly augmented transportation system.

Even with expanded and improved transportation facilities, companies using hard fuel and those using fuel oil not supplied by pipeline, may well be on the alert and watch national developments to the end that there not be a repetition of the deplorable situation arising out of a restriction in fuel supply throughout the country, as happened in the First World War period. The national fuel situation can change very rapidly.

According to reports from Washington, there is already a shortage of copper for use in non-defense industries. For 1942 the use of copper for defense alone, according to government figures, will exceed one million tons; production and imports are estimated to be 1,425,000 tons; demand, other than for defense, is placed at 1,571,000 tons. Consequently the shortage in copper for 1942 appears to be over a million tons.

It is expected that very soon it will be difficult—if not impossible—to get overhead and underground conductors, except for defense. Therefore, it follows that copper and other materials on hand should be conserved through the medium of establishing priorities of the managements' own making.

It may well be that voltage conditions, due to lack of copper or transformers, cannot be improved in the present emergency—as was the case during the First World War—and that the rationing of power in certain areas will again be imperative.

A view of the past as well as the warning in current conditions suggests a study of the possibility of power rationing, with its attendant consequences and legal aspects.

Practices and Policies

At the moment plans might be inaugurated to take advantage of the experience of the past and again adopt practices which will:

—Eliminate free extensions
—Transfer cost of extensions to customers
—Review maintenance and replacement programs
—Rearrange existing apparatus to take more load
—Defer new construction work where possible
—Hold stocks of material for emergency
—Encourage postponement of municipal improvements
—Make new business selections where possible with an eye on off-peak qualities
—Push collections rigorously to reduce accounts receivable
—Shorten deferred payments by customers
—Shift appliance business to dealer allies
—Control all expenditures rigidly

In 1917-18 employees were told that it was not the intention of management to permit properties to deteriorate through want of necessary replacements and that good judgment must be used in the postponement of maintenance. It was held that deferred maintenance should be avoided if possible and mortgage requirements with respect to such expenses should be reviewed.

Today, the situation with respect to operating practices seems rapidly to be approaching that of the summer of 1918. A lesson from the past might be drawn in an increasing number of respects.

Rate Clauses

Now, with both Federal agencies and State commissions having jurisdiction over some utility rate bases, as well as rates, relief from oppressive conditions —as in the First World War—will indeed be slow and expensive. It was bad enough 23 years ago.

In 1918 a National Committee on Public Utility Conditions was formed to study and act on the problems then disturbing the industry. The Committee represented the National Electric Light Association, American Electric Railway Association, American Gas Institute and National Commercial Gas Association.

Mr. Philip H. Gadsden, a Member of the Committee, speaking of the status of rate regulation, said, in part:

"The present system of rate regulation is inadequate. It was admittedly designed to regulate downward and it not adapted to granting prompt relief to meet violent changes in operating costs . . . no provision was made for universal variation in the prices of labor and material. After the war we should strive for, and insist upon, some system of rates more quickly responsive to conditions—some system which, under definitely fixed rules, will work automatically."

The object sought by Mr. Gadsden was not changes in basic rates, but rather some system, some clause in rate schedules that would compensate the utility for abnormal conditions in providing service and which would work automatically, thus bringing relief quickly to the utilities, and at the same time assist the authorities in their duties.

Such a compensating system is found in fuel, power factor, tax and commodity clauses in today's rate schedules. The first two clauses were the outgrowth of the First World War, while the last two might be said to be the product of the depression and the present emergency. Such clauses, if adopted, can make an effective and automatic tool of smooth operation, and thereby avoid, hereafter, no small part of the chaos and confusion of the past two decades.

Commissioner Basil Manly of the Federal Power Commission made an address at the National Association of Railroad and Utility Commissioners' convention in St. Paul, Minnesota on August 26, 1941, that might well be read with profit. After discussing problems relating to the amortization of emergency facilities he turned to the subject of utility revenues during the emergency, and said:

"Obviously rate reductions would not be justified where a utility may be receiving large revenues during a brief, temporary period with the expectation of suffering a serious decline when the emergency is ended. Just as obviously basic rates should not be increased to take care of a merely temporary increase in expenses."

Commissioner Manly did not define the term "basic" but the fact remains that clauses of the kind above referred to have significance and should be adopted as they are automatic in operation and are economically soundy.

Cash and its Conservation

If one can judge from the history of the period during the First World War, and looking ahead, it is certain that the production for National Defense will mean increased revenues for the utilities; but expenses will probably increase at a faster rate if drastic steps are not taken.

Never before have managers had to cope with the problem of increasingly larger taxes taking such a large slice out of income. Industry has, however, had to contend before with the requirements of labor, inflationary tendencies and

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Eliminating Guesswork from Advertising and Merchandising

By R. I. Seymour

Advertising Manager, Kansas City Power & Light Company, Kansas City, Mo.

Courtesy, Executives Service Bulletin, Metropolitan Life Insurance Co.

TIME and again advertising men have been called upon to determine accurately the results obtained from advertising. This is a question that confronts advertising people with troublesome regularity. To that question management wants definite answers, and in many instances has a right to be critical of the answers. Much of this skepticism is probably due to the vague and generalized reasons given to justify advertising in certain types of media.

Experience in our own organization has been no different from that of many others. For years we had used certain media, spent certain amounts of money, and carried on certain types of campaigns, principally because they had become habits and were accepted as the things to do. Some three years ago, however, circumstances brought us up short and caused us to revise our thinking and our plan of action.

Early in 1938 three different rate reductions became effective, and the result was a reduction of $1,435,000 a year in the gross revenue of the Kansas City Power & Light Company. Shortly thereafter, increased taxes, higher wages, and rising costs of materials, coupled with lowered gross revenues, caused our management to survey carefully all operating practices in order to find out where increased efficiency and savings could be effected. Naturally, advertising came in for its share of questioning. The problem of the advertising department was to provide management with definite answers as to why we should use certain media, spend certain sums of money, and develop certain appeals. It was either that or accept an arbitrary rearrangement of our program by management. The next move was up to us.

For a long time we had been considering advertising surveys, consumer studies, and market research, but various authorities seemed to hold so many opposite points of view on the merit of such studies that we were a bit hesitant about trying them ourselves. However, it seemed to be the only way of presenting our management with anything like facts.

In line with this thought, we brought into our organization a young woman with considerable experience in this field. Following many discussions of the problems and the determination of the advertising manager to accept the results whether or not they exploded his pet theories, we proceeded to make advertising studies and marketing surveys—and we are still making them. As a result, we have changed not only much of our advertising but also a great many of our merchandising practices as well.

We rearranged our newspaper advertising schedules. We proved the cumulative value of repeat ads which incidentally saved in production costs, indicated the best appeals, and gave us a barometer of the effect of weather on readership. A coincidental radio survey provided us with a basis for changing part of our broadcast schedule so that we greatly increased our listening audience and made a saving of $6,000. Two marketing studies supplied valuable information for planning campaigns on electric-range selling.

Another study of a premium offer was partially responsible for causing our company to discontinue the offer which had been in effect for many years, and this discontinuance promises an annual saving of $15,000 to $20,000. Also, we settled the question as to how our customers regarded an appliance repair service which was being brought to their doors by repair trucks. The survey revealed that more than 96 per cent of the customers were heartily in favor of a service which would put back into use appliances that had been gathering dust on shelves.

These and a host of other experiences have convinced us that marketing and advertising studies are of much value in eliminating guesswork, in revising preconceived opinions, and in removing prejudices.

Some of these studies have been particularly enlightening. Take the case of our newspaper advertising surveys. Two years ago we decided to develop one good advertisement, tie it in with our general electric-range theme, repeat the advertisement three to six times, and study the cumulative readership ratings. We prepared the advertisement carefully and scheduled it to run three times in each of our two city newspapers during a one-month campaign. Following each insertion we made a readership study, using a masked copy of the advertisement. Observation, identification, and copy reading increased with each insertion, the final run showing approximately 75 per cent increase over the first run.

Repetition has long been a keystone in successful advertising campaigns. It is our understanding, however, that few readership studies such as this have been made of repeated advertisements. This study convinced us that we should:

1. Spend more time in producing as effective advertising as we know how to write, then
2. Repeat more of these better ads and take advantage of the cumulative impressions.

To date we have followed this practice in four campaigns. The better results are apparent.

Another interesting study was that made on a premium offer. For years our company had been giving a set of selected kitchen utensils with each electric range sold. This policy was originally adopted as a means of increasing the efficiency of electric cooking and of holding operating costs to a minimum. Furthermore, at the time the policy was originated very few homes had heavy ware in the kitchen.

Premiums Discontinued

As the sale of electric ranges increased from year to year, the annual cost of these premiums became quite a factor and caused numerous discussions as to

(*Continued on page* 404)

Harmonizing Sales Effort With National Defense

By C. E. Greenwood
Commercial Director, Edison Electric Institute

An address before Wisconsin Utilities Association, Milwaukee, Wis., Oct. 13, 1941

IN view of rapid scene changes in the International drama, which have their reflection in the economic condition of U. S. A., those of us in the utility concerned with the sale of electrical energy and those responsible for power supply are confronted with complex situations. Adjustments are impeded by the numerous uncertainties surrounding National Defense effort.

The fact that these United States have become the avowed arsenal for all nations fighting for their liberty, and all-out production is the watchword, is of vital concern to the electric utility. Sincere effort is being made to support words by deeds in the assistance of America to allied countries.

Two years of the deadliest of conflicts abroad point out that this is a war of metals and chemicals. Americans are learning this lesson. Mechanized equipment for land, sea and air is required in stupendous volume. Outstanding in demand for fabrication of these tools of war are aluminum and magnesium, and the quantities required have resulted in unprecedented demands for electric power. Companies producing these in the past have not as a rule been customers of the private utilities. They have supplied their own power or purchased it from government developments. The government Defense Program generally calls for locations near government projects—when they can be ready to take on enormously increased loads. In the interim utilities in the nearby areas have been asked to furnish essential power. These unexpected demands, coupled with the inability of man to coax permanent water supply from the heavens, and break the drought in the South and elsewhere, have brought about the *Power Shortage* theme which has occasionally been emblazoned in the headlines of daily press media. There may be even an element of political strategy in this emphasis. Just one private utility in the South furnished 125,000 kw on call to a government water power project, and then in patriotic spirit advised its own customers of temporary power shortage and recommended saving in the use of electricity. Let it be added that the president of that company advertises it as "a citizen wherever we serve," and who will doubt it?

All utilities have been expanding to take care of the greatest production and distribution business in our history. Total installed generating capacities in the United States at the end of 1941 will be around 45,000,000 kw to carry an estimated peak of 35,000,000 kw. Isolated industrial plants will add 1,000,000 kw in 1941. Then there is scheduled to be added 3,200,000 kw in 1942, and 3,200,000 kw are already scheduled for 1943.

Additional generating capacity this year is approximately keeping pace with growth of load and next year the margin of spare capacity should be broadened. In the meantime, the rate of increase in industrial production is expected to narrow, and authorities in OPM expect the peak in defense production to be reached next Summer or Fall. We may conclude in the light of facts on power supply that there are safe margins for National Defense effort which is our first and greatest concern. But there is justification likewise, to proceed with the modest expansion of civilian business.

In addition to power supply there are practical economic problems facing the utilities. Although gross revenues are up 9 per cent this year over 1940, operating expenses have jumped to the same level. The ultimate toll of the National Defense program is beyond immediate comprehension, but we know the utility tax bill will jump this year to approximately one-half billion dollars.

If we are to attempt to attain normal growth of 3 per cent to 4 per cent in the light and power industry, load building programs must continue now and in the future. There can be nothing unpatriotic in self-preservation. However, commercial executives are to face many adjustments during the emergency period. The hurdles to be made in serving homes, stores, offices and factories will demand alert observation, profound thought and flexible planning. The conflict may be longer and much harder for us Americans than we realize and ahead lies the post-war construction period which will whip us if we do not prepare for it. I am heartily in accord with the statement of Mr. Walter D. Fuller, President of the National Association of Manufacturers, in a recent speech at Indianapolis when he said, "The prescription of American business and industry for post-war days is promotion and selling both now and in the future."

In a cursory survey of the utility field I have found few companies who have planned any serious restriction in sales budgets other than those brought about through shortage of equipment, and I would venture the guess that changes in promotional policy will be dictated by uncontrollable circumstances rather than any desire on the part of utility management to curtail new business development.

In Canada selling has been encouraged in all lines. Canadian utilities have not cut down appreciably on their advertising, and sales personnel has been reduced only by enlistments for Army service. There has been only limited credit curtailment. Dealer sales have increased with broadened demand. This past week the Department of Munitions and Supply in Canada ordered a 25 per cent drop in electric household equipment, the first of its kind since the war started two years ago. Carrying our thought across the Atlantic, it is likewise of incidental interest that demand for household appliances in Britain has been stimulated. It appears that women have left their homes for factory and outdoor duty and they find electric cooking devices convenient and serviceable for them and essential under their enforced living conditions. More significant is the fact that Britain is exporting electric cookers to her colonies. Can the U. S. A. who are not on full war basis afford to do less for customers in all-out service?

I would give you therefore observations on certain situations which confront commercial men in the utility as a result of our National Defense program and point out possible adjustments. These will not preclude the continued

promotion of new business, and retainment of the old.

Outstanding among the problems of production of armament and other precious war supplies is the allocation of sub-contracts. It has been brought out by Mr. Floyd Odlum, Director of the Division of Contracts Distribution at Washington, that 56 industrial companies hold approximately 75 per cent of Army and Navy defense supply contracts. Obviously a "farming-out" process should develop first, to speed up production, and secondly to prevent insofar as possible the rapidly gathering clouds of "priorities unemployment." It has been estimated that 2,000,000 persons will be out of work in the late Fall because of shut-downs through failure of factories serving civilian needs to get materials for production.

How many of these small industries might take on a sub-contract for defense needs? General Electric Company has farmed out $20,000,000 worth of orders to nearly 400 small manufacturing firms. The utility as a barometer of business is peculiarly fitted to assist in finding such firms, thereby aiding production, and at the same time rendering a service to its industrial customers. Other holders of large defense orders are ready to do what General Electric and others have done.

The power engineers have a specialized job in searching out prospects for subcontracts and in helping to keep alive "small business" which has been dubbed "the backbone of the country." Interpreted, that means they pay a big sector of the tax bill. The power men know where there are spare capacities and spare machines which might be changed over with a minimum of trouble for defense work. Keeping these customers in sound economic health assures valuable additions to utility revenue. However do not let this helpful assistance in finding openings for temporary sub-contracts dampen enthusiasm for the selective building of permanent business.

In addition to the group of smaller industries operating at low load factor normally, there is another group troubled with complete shutdowns by reason of materials shortage. These factories will be found mainly in the small towns where life in the entire community is changed as payrolls fall. The National Industrial Council estimates that 75,000 to 100,000 manufacturers large and small may be hit. Resulting conditions are far-reaching for the utility. Load drops at the factory; men and women out of work means that the family starts retrenchment in living costs of home and domestic meters have a sinking spell. Stores feel the real pinch and go thrifty as purchasing power is drastically curtailed.

Now the extent of industrial dislocation ahead will be governed by actual metals shortage. You have noted that experts disagree on availability of metals needed for civilian peace-time products. It is conceded in high places that unnecessary stock piles of basic materials have been built up around defense jobs as insurance against shortage. Repeating these over-estimates of real need hundreds of times has created an artificial national deficiency. It is gratifying to us that this situation has been sensed by OPM and plans are being made to remedy it.

In the immediate months ahead we may expect action by the Supply Priorities and Allocation Board to curtail production for civilian needs rather than to attempt allocation of materials to industries which will have its direct effect on the amount of electrical equipment there will be available for home and commercial applications.

During World War No. 1, the electric range was approved as an essential by the then War Industries Board because it conserved coal. It has today numerous other advantages and no ceiling has been put on production at this time. Automatic refrigerator quotas have been cut about 43 per cent over production for the twelve months ending July first, but even under that limitation there can be an output this next year equivalent to 1939. A radio tube requires eighteen different materials listed by the government as in the critical list. We can expect curtailment in output of the new radio products, but full maintenance of present equipment. Although production restrictions on lighting fixtures and lamps for civilian needs are in a state of flux, I understand that manufacturers are fairly well set for normal production for several months ahead. Experiments are being made in the interim in this line, as in other electrical equipment, bearing on the substitutions for vital metals of plastics, parchment and wood in order that electrical consumers may continue to have these products of utilization. Manufacturers of commercial cooking apparatus expect to meet demands for at least another six months or more.

Other situations arising from the defense effort will directly affect selling. First, we may expect limitations on a number of models of appliances. Stimulated by the request of Miss Harriet Elliott of OPACS, The American Standards Association is expediting standardization of ranges, water heaters, refrigerators, washing machines and flat irons. Government housing agencies are adding their blessings. Committees of Edison Electric Institute have been studying recently the standardization of electric water heaters in cooperation with manufacturers. Some of these projects which have been under discussion by technical representatives of utilities and manufacturers for a year or two may be rapidly pressed from without the electrical industry. Perhaps the advantage of economies effected thereby in production can be passed along to the consumer. The standardization movement commands the attention of the utilities in order that they may help in guiding consumer buying during the defense emergency.

Secondly, those who are dealing with markets are speculating on the effects of the restrictions of the Federal Reserve Board on instalment selling and how these may reduce sales volume of items that can be produced. Evidently present effect is not pleasing to the Board because more drastic curtailment is under advisement. Consumer psychology in buying is going to be influenced just as much by reduction in the family income, higher taxes and upping in the prices on equipment, as through reduction in maximum finance terms to eighteen months.

Authoritative credit sources bring out that the instalment credit volume of electric equipment is but a very small percentage of the total of all commercial loans. Therefore the prospective decrease due to regulations now promulgated is relatively unimportant. However cooperation of the utility with this regulation has been immediately evident.

Now there is one class of business that is in the clear on metal priorities and on deferred payments. That is your rural business. Electric water systems have A-1 priority; likewise electric dairy and other agricultural equipment. Today every third farmer in the nation is electrified, and as Mr. C. R. Wickard, Secretary of the U. S. Department of Agriculture has emphasized, the country needs more dairy farms. Wheat now represents but 6 per cent of the farmer's income and dairy products 18 per cent.

The farmer is unusually prosperous this year. You who serve the State of Wisconsin have a fertile market in which to reap a harvest. Prosperous farms are a fundamental in National Defense.

Another Defense Bureau at Washington is stimulating nation-wide interest in nutrition. The United States is well on its way to serving as the international "bread basket" in addition to its function as an arsenal for armament production. Food Minister Lord Woolton told Londoners recently that Great Britain is now relying on the United States for 25 per cent of its food supply. As food becomes scarcer and higher, thousands of American householders will depend on limited food selections for nutrition. This is a subject that covers wide areas of thought.

Good health in our fighting forces is a top consideration. But likewise is the good health of the civilian population with the result that food education becomes an essential.

At this time a splendid contribution is being made by the Home Service Divisions of utility companies in pointing out to consumers how to obtain greatest value from the foods they are able to obtain. Not only selection of foods, but new methods of preparation and cooking which will preserve full nutritive value—as for example when electricity as a fuel is used—deserves an important place in every Home Service program. The vitamin story should be extended through commercial cooking channels, stressing vitaminized meals on regular menus. Here is coordination with the National Defense Program which yields common benefit to all concerned.

Now in your adjustment to dislocations in distribution, do not forget the important dealer group among whom there could be many casualties. In some way you may ease the economic blow of defense restrictions for them. For example, you might be able to help sound dealers obtain a share of normal quotas of equipment or aid in stimulating volume of repair and maintenance work on equipment.

We in the electrical industry have for many years been trying to point out the human elements which make electrical living for consumers better living. We do not want to lose the ground gained, and must continue the obligation to supply our customers through direct sale, or through dealers, with such equipment that may be available, and to keep it in operation. Even in England today, after two years of inconceivable hardships, there is still freedom of use of energy for both commercial and domestic service. An excise tax of 30 per cent on electric household equipment there as against the present 10 per cent in the U. S. A., plus priority restrictions, have had their limiting effects on sales of new devices. But priorities are granted on all material for repair and maintenance of such appliances.

It is of pertinent interest that approximately 280,000 families have migrated from London leaving homes either wholly or partially destroyed. An outstanding activity of utilities there is to recover the electric equipment from these shattered structures and rehabilitate it when worth while economically.

Is there not a lesson for us in this knowledge? Should the time come when all-out defense effort should completely stifle our selling of new equipment, there is a maintenance job ahead of wide proportions. There are the "loafers" too among the thousands of appliances in which our customers have invested or received as gifts and thousands to be repaired. Is there a commercial man here who would not like to see the results in energy output if all the appliance investment of your domestic consumers was put to work? Some of our engineers might speculate on the results. However let's bear in mind this potential medium for energy sales. There will be opportunity to mobilize the dealers in any program to serve the electrical public. One point is certain. Should advertising by the manufacturers and utility cease the final economic prop for the average retailer would fall.

Do you recall the telegraphic message of President Roosevelt to the recent Convention of the Advertising Federation? It said in part: "Advertising has been responsible for many of the good things which citizens of the United States enjoy. It has been a potent force in making available to our citizens the products of American skill and ingenuity." . . . "That force needs now to be applied toward maintenance of our accustomed standards of living and further progress." . . . "As an educational force alone, advertising ought to play the leading part in the preparedness program. It can assist in creating and maintaining public morale." I maintain that advertising and promotion is an industry obligation.

One more defense consideration is wiring, which is the foundation of our sales superstructure. The fact that priorities have been granted for 300,000 homes for building under the FHA mortgage insurance plan, leads me to believe that apparent wiring shortages now will be overcome in numerous other fields of application. Is this not the time to bring about the economies possible through expanded use of thin-wall insulating material, and particularly an appreciation of covered neutral wire? Although it has not Code approval at this time, hundreds of experimental installations of CNX attest to the safety and value of this type wire. It has been estimated that if CNX were used instead of the BX, Romex, open wiring and wiring in conduit on an equivalent amount consumed in residential wiring in 1940, there would be a saving of 73,500 tons of steel and 1000 tons of crude rubber. Surely such wiring material merits official recognition.

Finally, in any attempt to harmonize sales progress with National Defense effort, we cannot dodge consideration of other factors bearing on the growth in use of electric service. The utilities are meeting face to face with practical problems of load losses due to temporary dislocation in home life as boys are called into service and migrations in labor increase, both of which are superimposed on that natural mortality which has been creeping on us as a result of greater efficiency in the agencies for supplying light and other household services.

In a two-year period in which the sale of major appliances has reached new peaks, the increase in the output of electric energy in the homes of utility customers has shown smaller average increases than before. The replacement of the old with new and more efficient refrigerators, ranges and radios has served well the customer's interest but it has placed a drag on normal domestic growth. Likewise the predominance of the small home in the new customer column with its smaller use; the drop in use of current for domestic purposes as father leaves for the higher-wage communities, as son leaves home for military service, as daughter answers the call for industrial labor, have all been found to contribute to the slackening in speed of growth in energy output.

As convincing evidence of how one of these situations will influence kilowatthour sales I give you the experience of a utility company that has just completed a survey to arrive at the cause of a continued drop in average domestic sales

increase. Replacements and other conditions gave some clue. Then the list of draftees and others who had gone into service was obtained on the lines of their companies. Over 700 of these homes were studied and the average drop in use in this group was found to be 9.3 per cent. Will this change in electrical living be permanent? Commercial men must find the answer.

If time permitted we could discuss the effect of the coming surge of fluorescent lighting in the domestic field. The new bent tubes, already marketed by one smaller manufacturer, will in the near future come from the factories of the Mazda group. As these new styles win public approval (which without doubt they will because of their attractiveness and because they are usually sold on the basis of making drastic cuts in the bill for electric service), it will require present intensive promotion along the educational lines of Better Light for Better Sight to retard drastic changes in energy sales. Factory lighting is reaching higher standards in intensities to help speed production, but opportunity is wide open for more intensive sales work in the commercial field and on the highways for higher intensities of illumination.

In view of the conditions enumerated Commercial Departments cannot afford any black-out in promotion of electrical use, nor should there be much slackening in selling pace. "Out of sight—out of mind" applies to every utility consumer. In the maelstrom of exciting news and adjustment to restrictions, keep the customer's mind clear on electric service values. There are fallacies in the theme of SAVING ELECTRICITY.

The eyesight of the family members is just as precious during emergency months as during any other, and higher levels of illumination should be maintained; the economy of electric refrigeration and of electric cooking is of even greater importance now than ever before with their lessons in thrift; in these days of servantless homes more electric labor savers can be more advantageously put to work. Why—in war-torn Britain, to which I would refer again, the recent Convention of the Women's Electrical Association had as a program feature KITCHEN PLANNING. Is that not forward looking! Shall utilities in U. S. A. be less so? We at Edison Institute expect to continue promotion of the all-electric kitchen as one essential in maintaining morale, or as we said in 1918, keeping the "home fires burning" which is of fundamental importance in any emergency. Our national promotion will be designed to help you to sell your customers to "save through the use of electricity" rather than just to "save electricity."

As the record now stands, the backbone of utility revenue—the 26,400,000 residence meters including farms—showed an average monthly gain of approximately 7½ per cent in energy output during the first six months of 1941 compared with a 10 per cent average for the same period last year, and yet all-time highs have been recorded in volume sales of equipment during that period. Output still is slipping for reasons enumerated, and the gain in average output for domestic meters is practically at a standstill.

I give you National Defense effort as a challenge to selective and effective sales and promotion. There is unity of purpose in the light and power industry to harmonize this sales activity with National Defense effort to the full. Electricity will be the key to defense only as we impress its benefits in all phases of home, business and industrial life. The job ahead is one in which the commercial and technical forces must work together, and I express complete faith in the spirit and performance of the utility forces to achieve their objectives.

Eliminating Guesswork

(*Continued from Page* 400)

whether or not the policy should be changed. Opinions were divided, one group maintaining that discontinuance of the premium offer would reduce the efficiency of electric ranges and result in materially decreased sales. The other group contended that the sale of heavy ware had become so general in recent years that the majority of housewives had several utensils of standard size, and that discontinuance of the offer not only would have no effect on sales but would reduce expenses materially.

Since we had only individual opinions upon which to base a decision, it was decided to make a customer study to determine just what equipment customers owned before they purchased electric ranges. A list of recent purchasers was compiled and from this a fair cross-section was selected; the purchasers thus chosen were then contacted to settle the question. The final tabulation showed that more than 50 per cent had owned an adequate supply of right-size utensils previous to the purchase of their range. It also provided much additional information. This study had a definite influence in causing our management to discontinue the premium offer.

As this is being written, tabulations on two other surveys have just been completed.

One was made to learn how "Reddy Kilowatt" compared with other national trademarks and figures in acceptance and recognition. The results indicated that he is recognized and identified by a very flattering majority of the people, children classing him particularly high by comparison. However, the study also disclosed that we must give more emphasis to his name, what he is, and what he does. It proved again that we cannot afford to rely on our opinions as to public acceptance of an idea or product.

The other survey was made to gather facts upon which we could develop a merchandise plan to increase the sale of electric kitchens in new homes. Again management was confronted with conflicting opinions of department heads as to the proper policy to pursue. We have not yet arrived at a conclusion, but this market study has provided a set of facts which state the problem clearly and give a better basis for establishing a sound plan.

All the survey work is directed from the advertising department and is in charge of the young lady mentioned earlier in this article. She conducted some of the surveys alone; on others additional help was obtained locally. In the case of newspaper surveys where a large sample was taken on the day following publication, and on coincidental radio surveys where a large sample was necessarily taken while the program is in progress, she had additional help. In every case the extra people hired were experienced in such work. Only two of the many surveys were made by telephone. The others were carried on by personal contact.

It is difficult to measure the cost on a dollars-and-cents basis in comparison to results. Some surveys can be measured to the penny; others cannot, because some are conducted on advertising, some on merchandising, and some on institutional problems. However, the cost of *all* survey work is less than 1 per cent of our advertising budget.

We do not present our experience as conclusive evidence of any perfect plan to follow in all cases. We do contend that it is a big step in the right direction to provide facts instead of opinions upon which advertising and merchandising plans may be predicated. All that can be expected from any survey is that the problem will be stated. If it can do that *clearly*, then management will be in much better position to apply correct formulas to the solution of the problem.

A Note on Power Supply in Warring Countries

By H. S. Bennion
Vice-President and Managing Director, E.E.I.

Reprinted from *The Military Engineer*

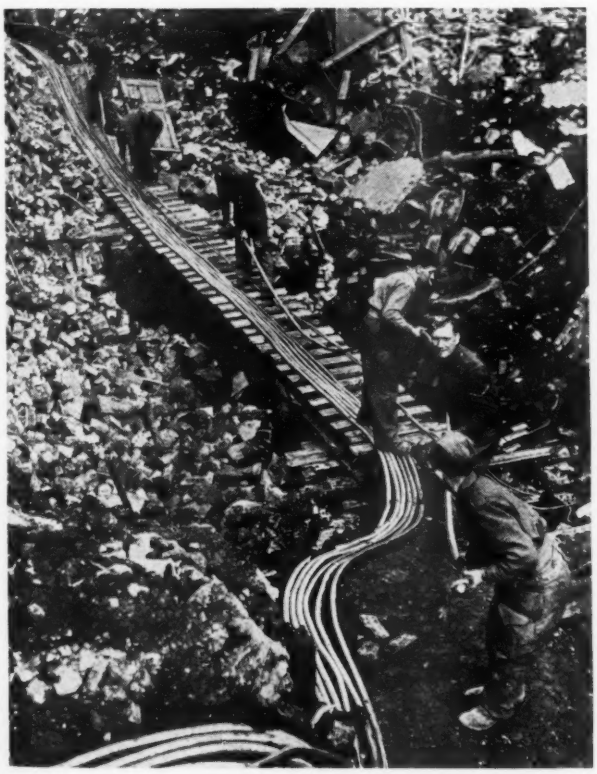
IN our everyday activities so much dependence is now placed on electric service that the following gleanings of information (gathered and surmised from technical journals and a few uncensored reports of happenings in warring countries) are of great importance in considering civilian defense measures.

Air bombing appears to be temporarily effective against underground utility distribution systems of all kinds, electricity, water and gas. Overhead electric distribution circuits have proven to be less vulnerable. The effects do not appear to be decisive or permanent, however, since repairs are made promptly either as improvisations or permanent repairs. The duration of outages due to disruption of these facilities grows shorter as operating personnel learn what to expect, how to prepare for it and how to proceed when it occurs. In the light of experience distribution circuits are sectionalized, the most suitable repair materials are made readily available, and the procedure well organized and perfected.

In the United States, floods, hurricanes, ice storms, and occasional fires have given the personnel of electric utility companies considerable experience in emergency repairs; and it must be noted that in the case of widespread storms the damage to be dealt with has been vastly more extensive than that which bombing occasions.

The most serious effects of bombing to any utility appears to be the rupture of water mains in conjunction with incendiary bombs, since the means of fighting the incipient fires is thus impaired and they may gain considerable headway. The importance of this feature may be judged by the stress laid upon the desirabilty of local, standing water supplies, such as tanks, pools and other forms of local water storage.

While definite information is lacking, it appears that electric generating stations occasionally hit, and no doubt sometimes damaged, have not been put out of action completely or permanently as a result of enemy bombing, notwithstanding the fact that important generating stations have been among the objectives of bombing attacks. A German article relates that a certain Dutch generating station which had been bombed, and evidently hit, for the removal of a dud bomb within the works was necessary, was "slightly damaged but able to operate." This exhibit of the relatively indecisive effect of bombing upon modern, fireproof generating stations appears to be borne out by verbal reports of British experience and by the record of output there, which could hardly have been



Repairing London's Bombed Telephone System—Engineer emergency squads placing cables across large bomb-crater, by means of a temporary bridge.

Extra Permanent Water Pipes for London Supply—These pipes have been fitted through the streets; numerous extra hose can be connected for supplying water in case of fire.

The Army Assists in Repair of Telephone System—Soldiers of the Royal Corps of Signals atop a telegraph pole to repair wires brought down by a nearby bomb.

Overhead Wiring Repair in London—Wiring of a street lamp beside a damaged building is repaired the morning following the raid.

maintained at better than the pre-war level if any large amount of generating apparatus had been out of service for any considerable period of time.

Quite a different picture is presented of the effects of large caliber artillery fire, as indicated in a German article describing the restoration of utility service after the occupation of Warsaw in September, 1939. Although primarily a description of the restoration measures that were taken, the article incidentally gives considerable information on the effects of fire.

Although Warsaw had been heavily bombed, the damage to the power plant was specificaly ascribed to artillery fire. Warsaw was subjected to artillery fire of all calibers for eight days. As a result at least two turbo-generators in the Warsaw power plant had received direct hits and the remainder showed many hits of a lesser degree. All of the boilers were unfit for service apparently as a result of punctures by shell fire. The German article describes how the boilers were rendered serviceable by means of welded patches. The extent of the mechanical damage may be estimated from the following time schedule for restoration.

0	day	Station completely inoperative
5th	"	Two units, aggregating 18,600 kw in service
12th	"	Third unit of 15,000 kw in service
30th	"	50,000 kw of an original 107,600 kw in service

Concerning water supply, the article related that a rapid filter had been completely destroyed and chlorinators seriously damaged by artillery fire. The pumping plant was apparently not damaged but was unserviceable because of failure of the power supply. The gas works were badly damaged, in most cases as the direct result of artillery fire. For example, 30-inch pipes and valves were broken, apparently upon impact. Restoration of these water and gas services presented no unusual features beyond the efficiency and expedition with which the work was completed.

One German article deals at some length with the demolition methods employed by their adversaries during their retirement from Holland, Belgium and northern France. Reference is made to a Belgium generating station (which had been wrecked by hand) where many parts, such as control instruments, insulators and insulating bushings which could not readily be replaced from any available stock were merely broken. Apparently this method of demolition was rather efficient. In other cases is was related that essential parts of apparatus were removed by technical specialists among the retiring troops. These acts, however, merely resulted in temporary delays in restoration of service.

Information as to new construction of power facilities and power output of generating stations has been closely guarded in the Axis countries for the past four years. Recent news stories in this country have indicated prodigious increases in German controlled capacity and output in recent years. So far out of keeping with past performances is this that it seems questionable. At the time of the World War the Germans were given much more credit in such respects than later information showed they were entitled to. The same is probably true at this time, though they did make big power gains from 1936 to 1940.

The British have been much freer in publishing information concerning electric power. When the war broke out new installations were stopped and the machinery planned to be installed was sold in the export trade. Information is slow coming out as to output but the figures for the end of March, 1940, showed output up about 4 per cent and maximum demand down by 3 per cent. This was an average figure, as might be expected. Certain areas affected by war industries and by the influx of population from the big cities showed substantial increases up to 15 and 20 per cent. It is to be expected that this local variation has happened to a greater extent in Germany because that country has gone to greater lengths in scattering its industries to make them less vulnerable to bombing attacks.

Defense and the Daily Work

The Dual Duty of Home Economics

By Guy G. Smith

Advertising Manager, Cumberland County Power & Light Co., Portland, Me.

THOUGH defense requirements bring about decreased manufacture of major electric appliance units, this should not cause curtailment of home economics activities of utilities, distributors and manufacturers; but rather afford opportunity to initiate a broader type of operation; a creative service to put a solid foundation under the electric range sales already made, to lay groundwork for increased sales after the emergency to all types of families; and, quite important indeed, to cooperate with the national defense program by helping to disseminate knowledge of proper nutritional standards among the populace.

As for defense: the Government, the Red Cross and other organizations are deeply serious about building sound physique and morale among all of our people through nutritionally adequate diets. Both the Army and Navy have highly qualified nutritionists borrowed from private industry in charge of food selection and menu making; but the program on nutrition goes far beyond this, as the following symposium shows:

In the words of President Roosevelt: "During these days of stress the health problems of the military and civilian population are inseparable. Total defense demands manpower. The full energy of every American is necessary. Medical authorities recognize completely that efficiency and stamina depend on proper food. Fighting men of our armed forces, workers of industry, the families of these workers, every man and woman in America, must have nourishing food, if people are undernourished, they cannot be efficient in producing what we need in our unified drive for dynamic strength."

Dr. Henry C. Sherman, Professor of Nutrition, Columbia University, puts it this way: "Nutrition means the freeing of perhaps one-third of our people from ills directly or indirectly due to food conditions. It could mean, also, the building of higher health and efficiency in people who are already well and efficient. How to bring enough of the protective foods into the dietaries of all the

MR. SMITH

people is both an economic and an educational problem. . . . Each of us who can do anything for nutrition education should do it at once and continually, and with confidence in its value, however keenly we may feel that there should also be some way found, some means provided, to improve the purchasing power of the low-income families of our Nation. . . . A simple approximation of a sound scientific probability would be to say that the present-day science of nutrition offers an extra decade to the human life lived under its guidance. And the extra years, whatever their number may be, are not added to old age."

Applying quite specifically to the aid which home economics groups within the industry may render this cause, the National Nutrition Conference for Defense recommends among other things:

a. Vigorous and continuous research to add to our present knowledge of the nutritional needs of individuals, the nutritional status of groups in the population, the nutritive content of everyday foods, and the effects of various methods of processing, storing, and cooking in their nutritive value.

b. More widespread education of doctors, dentists, social-service workers, teachers, and other professional workers in the newer knowledge of nutrition. At present this knowledge, especially in its practical applications, is familiar to far too small a group even in the professional field.

c. The mobilization of every educational method to spread the newer knowledge of nutrition among laymen by means of schools, motion pictures, the radio, the public press, home and community demonstrations, and all other means.

d. Mobilization of all neighborhood, community, state, and national services that can contribute in any way to the raising of the nutritional level of the people.

And, Mrs. Franklin D. Roosevelt summarizes the situation informally when she says: "There is a big job to be done in every community; and don't forget it would be much more exciting to learn how to drive an ambulance and to shoot troops which drop out of the sky . . . however, the necessity now is that of doing the less dramatic job of improving nutrition everywhere."

Here, then, is a notable opportunity for the electrical industry, through its various home economic groups, to aid in the widespread nutrition education efforts being so vigorously sponsored by Government and important private welfare organizations; and at the same time tell its incomparable story of vitamins and better food through scientifically-controlled heat and waterless cooking. Nor is there anything selfish about this. Proper cooking is a most important phase of nutrition.

That there is a vast field in catering to the nutritional needs of the populace is manifest these days by the fact that drug stores are doing a land-office business in synthetic vitamin preparations, and manufacturers are vying with one another in adding vitamin concentrates to their products in order to take advantage of the trend and thereby increase sales. What a golden opportunity to tell and SELL the electric vitamin-cookery story!

Consider how many vitamin units are retained in natural foods after a dollar's

worth of cooking in an electric range! Wouldn't the widespread telling of the story of better nourishment through modern electric cooking be a real factor in aiding defense by apprising the people of this simple way to augment their nutritional input? Of course! And, that's *Creative* home economics. That's an individualized, personalized means to an end—granting that the Industry's goal is still the sale of the manufacturer's product and the utility service. The home economics personnel charged with such a worthwhile and inspiring mission would certainly function with an efficiency and enthusiasm seldom attained in the routine pursuit of their calling.

Aside from the opportunity to cooperate in building a nutritionally sounder nation, the daily work must go on. Not business as usual, since this has been ruled out. Still, as nearly so as may be possible. There can be no real quarrel with this since Defense must be financed through business activity. This means that home economics groups within the Industry must strive to keep up the day to day work.

It was the idea of showing the public the benefits (not the workings) of electric ranges and refrigerators that first brought home economics into the electrical industry. Though there has been some recent criticism, cooking schools can be effective means of demonstrating to the public the superiority of automatic electric cooking, if the programs are creatively constructed and presented.

Under the impetus of today's business upsurge, the home economics groups of manufacturer, distributor and utility should be permitted to divorce themselves from sales effort for its own sake and get back into their true orbit of constructive creative activities. Because, if a home economics departments is not creative—not allowed to show the way in its own professional sphere to homemakers—it has little reason for being.

In the past, cooking schools have been directed mostly to income groups. Today, however, under the stimuli of Defense spending, when the rich feel poor and the poor feel rich, 'most everyone has the money with which to buy an electric range. The electric cooking story rings with greatest emphasis when told not to income groups but to "use" groups.

For example, millions of workers are now employed in defense manufacturing or projects. This at once creates very large groups of families with approximately the same scheme of living and need for similar types of foods, appliances and services. We are concerned here with the need for foods—certain types of nutritive or energy-building input. Why not, then, devise a series of cooking programs for this "use" group of defense workers' wives, to show them how much better their food will be cooked electrically and how much easier the cooking may be done this modern way.

Pursuing this idea further, many defense workers must eat heartily three times a day, but one of these meals must be eaten cold on the job. Wouldn't this group be interested in the presentation of menus and dishes that would provide both appetizing and nourishing hot meals at home and leftovers for meals on the job? Undoubtedly. And, since these people are earning good wages, and increased business must come directly from these groups if anywhere, isn't it good thinking to appeal directly to them as a unit or "use" group, rather than to offer a generalized home economics "program" that fits nobody exactly?

Appealing thus to "use" groups—and putting the cooking back into the program—is a type of home economics that would be a credit to the industry and a service sure to pay dividends all around.

Anyone with a price book and catalogue can write the order *after the sales impetus has been achieved;* but, real intelligence and individualized performance are required to *create the desire* for the product or service. Home economics can assist in this most important phase of selling with programs that create the atmosphere for the final sales presentation by the regular sales force; but of itself it cannot take the place of direct selling nor even aid in selling with the gimmick-gadget, sales type of program into which it has been seduced under economic duress and competition.

In reading the above, it must not be supposed that the demonstration of the features on range models would be proscribed. This is a valuable procedure, but only when presented secondary to the creative cooking on the program.

Continuing further the idea of Creative home economics programs for manufacturers, distributors and utilities the following cooking school programs are offered for general consideration:

BOUNTIES ON A BUDGET. A series of cooking demonstrations to show homemakers how to get the most nourishment from a scant budget or how to have more money left for other necessities without penalizing the physical welfare of the family. Few homemakers really know the ins-and-outs of food purchasing, particularly as related to meats. They would more than welcome such a program. And, that's where home *economics* comes in—and stays to do a creative selling job!

FOODS IN FASHION. Suggested as a series of demonstrations designed to bring middle-age and older women up to date on the new nutritional standards, and the value of waterless electric cooking in retaining vitamins, mineral salts and other nutritive elements within the food. This is exactly the class of people with money to buy at any time, but who of their own volition, would never be in the market for new equipment. This class is a hard nut even for star salesmen to crack.

TEA FOR TEN, TWENTY, THIRTY. Programs covering the making and baking of dainty cakes, cookies, short-breads, sweet doughs and assorted pastries. This would be of interest to clubs and welfare groups who sponsor silver teas, bridge parties and other money-raising affairs.

COOKING FOR 50 OR MORE. A series of programs for chairwomen who are key members in church or club groups, and thus in a position to influence others in the purchase of major appliances.

MEAT EXTENDERS. Meat is the most expensive item in a meal and becoming increasingly so. Programs devoted to dishes that make meat "go farther" would surely win adherents. This also could include substitutes for meats and nutritious meals without meat.

SCHOOL FOR BRIDES. The idea here is that brides would welcome cooking school instructions and the opportunity to exchange homemaking experiences; and that they are young and susceptible to new ideas, while husbands are susceptible to persuasion from their brides on the topic of buying major electric appliances.

And, to conclude these suggestions (you doubtless can think of many other interesting types of programs)

SPORTSMEN'S DINNERS. A pro-

(*Continued on page* 415)

Rural Electrification in the United States

PART II—NATIONAL DEVELOPMENT, 1924-1935; THE C.R.E.A.

By Royden Stewart

DURING the pioneer period in rural electrification — roughly, from 1906 to 1923—it was natural that the main emphasis should be on building line extensions and inducing farmers to use electricity for lighting and for farm tasks in which it could be easily substituted for other sources of power. But large-scale development involved much more than the belting of electric motors to old farm machinery. G. C. Neff, Chairman of the National Electric Light Association Rural Lines Committee in 1923, stated the problem as two-fold:

(a) How service can be supplied to the farmer and what is involved in its establishment;

(b) How service can be utilized by the farmer so that it will be profitable to him.[8]

In industry the advent of the electric motor had led to the development of an almost entirely new line of factory machines and the devising of new production methods to take the greatest possible advantage of the use of electric energy. Essentially the same task had to be done in agriculture before the relation of seller and buyer could be made mutually profitable. The electrification of the farm, however, faced a major limitation which did not exist in industry; the use of electric power was not practicable in field work and hauling, which represented more than two-thirds of all farm power requirements, and another modern source of power, the internal combustion engine, was rapidly taking over these jobs.

There were other important differences. The cost of distribution lines was not an obstacle to electrification in industry; the consumer units were comparatively large and usually situated near existing generating plants; investment capital was quickly obtainable and financial returns were much more immediately certain. Therefore the utility, the equipment manufacturer and the customer were able to cooperate fully in developmental work, to the profit of all three. In the farm electric market the customer—the individual farmer—could not undertake an important share in corresponding development. But it could be done for him by the national farm organizations, the Department of Agriculture and the state agricultural colleges, which could afford to finance the work of research and investigation, hiring the expert services of the new profession of agricultural engineering.

Organization of the C.R.E.A.

The National Electric Light Association and the American Farm Bureau Federation agreed in March, 1923, to take the lead in organizing a national body to coordinate the activities of all the groups interested in farm electrification. On Sept. 11 of the same year, at a meeting in Chicago, the plan was put on a working basis through the formation of the Committee on the Relation of Electricity to Agriculture. Of the committee's 12 members, three were officers of the American Farm Bureau Federation, four represented the NELA, and one each came from the American Society of Agricultural Engineers, the manufacturers of farm electric plants and the Departments of Agriculture, Commerce and Interior.[9] J. W. Coverdale, of the Farm Bureau Federation, was elected chairman and G. C. Neff, of the NELA, secretary. Later Dr. E. A. White was appointed salaried director.

The committee outlined four investigations to be carried on under its general supervision: (1) a farm power survey, (2) a survey of central station and isolated plant service to farmers, (3) a survey of agricultural uses in foreign countries and (4) experimental and research work on the uses of electricity in agriculture.

The First Count of Electrified Farms

The survey of service (2) was made by the NELA. The first national count of electrified farms,[10] recorded a total of 177,561 farms receiving service from central station electric companies on Dec. 31, 1923. This was 2.8 per cent of the 6,371,640 farms in the United States, as reported by the 1924 Census of Agriculture.

In each of seven states, the survey showed, more than 10 per cent of the farms had "high-line" service from electric utility companies. (Table 1.) The first four of these were Far Western (Pacific and Mountain regions) states, showing that irrigation pumping still provided the most important basic demand; the other three were New England states, where line extensions were favored by density of population in rural areas, including many industrial and non-farm residential consumers, and where rural service had been aggressively promoted by many utility companies. The four states ranking next also were New England and Far Western. But outside these two areas, the showing was poor. In all the rest of the country, only three states had more than five per cent of their farms connected to utility lines. Eighteen states had less than one per cent—almost no rural service; of these, eleven were in the South Atlantic, East South Central and West South Central groups —in general, the regions where farms were most scattered, per-farm income was lowest and little or no irrigation was used.

TABLE I—STATES IN WHICH MORE THAN FIVE PER CENT OF FARMS HAD CENTRAL ELECTRIC SERVICE ON DECEMBER 31, 1923

State	*Per Cent of Farms*
California	23.5
Washington	18.3
Utah	12.9
Idaho	12.5
New Hampshire	11.4
Maine	11.3
Connecticut	11.3
Rhode Island	10.2
Oregon	9.4
Vermont	8.6
Massachusetts	7.3
Ohio	6.9
Pennsylvania	6.5
Iowa	5.3

The Power Survey

The power survey (1) was conducted by the Department of Agriculture, which reported the findings in its Bulletin 1348, February, 1926.

According to the survey, United

[8] *NELA Bulletin*, March, 1923, p. 153.

[9] Groups which joined later included National Grange, American Home Economics Association, General Federation of Women's Clubs, National Association of Farm Equipment Manufacturers and National Electrical Manufacturers Association.

[10] In 1919 the Bureau of Public Roads of the Dept. of Agriculture made an estimate placing the number at 100,000.

States farms had available a total of 47,420,000 horsepower of primary power, other than man power, and were utilizing 16,000,000,000 horsepower-hours a year. Of this, 11,300,000,000 were required for draft work (hauling and field work), leaving 4,700,000,000 for stationary work, in which electric power might conceivably be used. Central station electric power was supplying 750,000,000 horsepower-hours, or 16 per cent of the total employed in stationary work; another 150,000,000—3.2 per cent—was obtained from 300,000 individual electric plants.

The total annual cost of power for both draft and stationary work was reported as $3,000,000,000, of which $53,000,000 was for central station electric service and $38,000,000 for power from individual electric plants. From these estimates, it could be computed that the average cost of central station electric power to the farmer was 7.07 cents a horsepower-hour, or about 9.17 cents a kilowatt hour; where individual plants were used, the cost was 25 cents a horsepower-hour, 32.89 cents a kilowatthour. Power from large stationary engines cost 4 cents a horsepower-hour, from small stationary engines 8 cents; but utilization from small engines was three times that from large, so that all stationary-engine power cost an average of 7 cents a horsepower-hour, about the same as central station electric power. These tabulations took no account of lighting and household tasks, which, though their requirements were comparatively small, represented almost the only potential uses of electricity on a great number of farms.

The C.R.E.A. Program

Such was the uneven picture that farm electrification presented in 1924, when the C.R.E.A. began its work. The committee did not plan itself to undertake or directly promote (except as tests) the construction of distribution lines. Its mission was to make the further expansion of rural electric service economically feasible for farmers and utility companies by developing profitable or desirable farm uses of electric power. It therefore mapped and carried out a far-reaching, unprecedented program of research, experiment and education.

The national C.R.E.A., which had offices in Chicago, was the central coordinating agency. Under its leadership, 27 state committees were established to initiate and help finance (mainly from funds contributed by electric light and power companies) the actual work of research and experiment. Most of the laboratory tests were carried out by state schools of agriculture at their experiment stations. Every known use of electricity on the farm was carefully re-examined and many new uses were developed; exhaustive tests of applicability were made and comparative cost data were assembled. The results were reported to the national committee, which accumulated and published them in a series of bulletins and news letters.

The experiments were not allowed to end in laboratory records, however. Application of the research findings in actual farming was an integral part of the program from the beginning. In each of seven states a rural distribution line serving a typical farming community was selected or built as a test project. The state C.R.E.A.'s, utility companies, agricultural schools, equipment manufacturers and farmers collaborated to establish these test projects and operate them under controlled conditions. The records of the test projects and the other experiments, conducted under C.R.E.A. sponsorship by agricultural engineers are still the most complete and dependable body of data on the use of electric power on the farm.

The Red Wing Project

The first state project, and probably the best known, was the one established by the Minnesota C.R.E.A. in the Burnside community near the town of Red Wing. The distribution line, 6.3 miles long, was built by the Northern States Power Company to serve 19 prospective rural consumers, of which 16 eventually were connected, and began service in December, 1923. Distribution was at 2300 volts, single phase, using iron messenger wire. Later, the iron wire having given the usual trouble of excessive voltage drop, all-copper construction was substituted, and in 1926 the voltage was increased to 6900. The rebuilding brought the total cost of the line, including transformers, arresters, etc., to $11,154.12,[11] or $1,770 a mile. This would have justified a monthly fixed charge of $9.54 for each consumer, but the original estimate of $6.90 was adhered to in actual billing. Energy used was charged for at the rate of 5 cents a kilowatt hour for the first 30 kilowatt hours used each month, 3 cents a kilowatt hour for all excess.

Seventy-nine manufacturers of electrical and farm equipment cooperated with the farmers (eight of whom took part in the controlled tests), the utility company, the C.R.E.A. and the University of Minnesota in financing the tests. To June 1, 1928, a total of $75,158 had been expended on the project, including equipment worth $21,632 lent by the manufacturers, $9,374 contributed by the university and $17,500 by the C.R.E.A.[11]

The Red Wing test was concluded in 1929. In addition to the carefully collated records of individual application, complete operating data for five of the farms were reported for the years 1924-27, inclusive, and from these the project directors were able to draw certain fairly definite conclusions as to the economics of "total" farm electrification under the conditions obtaining in one kind of farm community. After all adjustments, a consolidated statement of revenues and expenses of the five farms showed decided increase in both net cash income and net labor income (cash income, plus housing and food, less all depreciation and interest) for the three years following 1924. The increase in net labor income over 1924 was 45.7 per cent in 1925, 47.2 per cent in 1926 and 79.1 per cent in 1927. Operating expenses for 1927 were only 1 per cent greater than for 1924 (although taxes alone were 65 per cent higher) while revenues were 42.9 per cent greater. An undetermined part of these gains was due to a rise in the prices of farm products; but there could be no doubt that these five farmers had profited from the intelligent application of electric power, in addition to the incalculable gains in living conditions. And the operation of the project had contributed appreciably to the growing accumulation of proved data on the practicability and cost of farm power applications.

In 1927 the average monthly service bill on the Red Wing line (including the fixed charge) was $14.67.[11] The average monthly consumption of the customers participating in the project rose from 154 kilowatt hours in 1924 to 287 kilowatt hours in 1927; in the same period the average cost per kilowatt hour declined from 8.2 cents to 6.1 cents.[12]

Other Test Projects

It should not be inferred that the Red Wing line was typical of C.R.E.A. test

[11] *The Red Wing Project on Utilization of Electricity in Agriculture*, Univ. of Minn., 1931.

[12] Cf. Average cost per kwhr for all residential consumers in U. S. for 1924 was 7.2; for 1927, 6.8 cents. (Edison Electric Institute.)

projects. Each state committee was free to devise and operate its own tests according to its judgment and local conditions. Regional variations in farm economy, power production costs and construction standards (according to local topography and weather) caused corresponding differences in costs, financing methods, rates, applications and usage and, consequently, in over-all results.

On the Wisconsin test line, erected near Ripon in 1924, two canning companies were required to pay $650 each toward the cost of line construction, the contribution of an individual farm customer being set at $300. Rates were the same as Ripon city rates, plus a rural charge, initially fixed at $1.00 a month, to cover differences in transformer core losses and depreciation between urban and rural lines.[13] In connection with this rural charge, the Wisconsin C.R.E.A. pointed out:

"When enough current is used on a rural extension so that its value at urban rates exceeds 4/10 of the cost of the line, the great bugaboo of rural charge practically disappears. Where the line cost is $300 per consumer and each has a 5-kva transformer, the use of $136 worth of current a year will completely eliminate it."[14]

The financing plan and rate schedule used in the South Dakota test, at Renner, were similar to those in effect on the Red Wing line—possibly because the same utility, Northern States Power Company, supplied both communities. Local conditions and policies also governed the financing plans and rate schedules for the test projects at Garner, Iowa; Larned, Kan.; Marysville, Ohio, and Tolono, Ill.

As a show-window for the work of the state committees, the national C.R.E.A. and the NELA in 1928 established the National Rural Electric Project at Sandy Spring, Md., not far from Washington. Five farms, selected as representatives of dairy, fruit, poultry, truck-garden and general farming, were connected to utility lines and equipped with electric appliances loaned by manufacturers. The primary purpose of the National project was not to test electric uses in local farming practices, as was the case with the state projects, but to demonstrate the practicability of the uses that had so far been developed and tested. Charts and graphs, showing the achievements in farm electric applications, were displayed in the project office. In addition, the National project served Research Director George W. Kable and the University of Maryland as a laboratory for the working out of problems considered of national importance in farm electrification. The project was operated for five years, financing being supplied by the NELA and local utility companies.

Records show that the C.R.E.A. program was carried forward ably and energetically. The NELA, its successor (in 1933) the Edison Electric Institute, and individual light and power companies supplied funds generously; state universities and agricultural schools contributed the services of their experts and use of laboratory facilities; 226 manufacturers lent equipment for experiments and tests, and, until 1935, the Department of Agriculture extended full cooperation.

The total cost of the work cannot be determined accurately. The NELA and the EEI advanced altogether about $400,000 and the individual companies about $1,000,000. Free services and loans of equipment probably added another $1,000,000 or more.

The C.R.E.A. continued its activities until 1939, but it ceased to be the most prominent agency in the rural electrification movement in 1935, when the REA was established. The American Farm Bureau Federation, the National Grange and the Departments of Agriculture, Commerce and Interior withdrew from membership, leaving virtually the entire burden on the utility companies.

Results of the C.R.E.A. Program

Both of the basic problems with which the Committee concerned itself, namely, the profitable supply and use of farm electric power, had by 1935 been brought much nearer solution. The far-reaching research and experimental work done under C.R.E.A. sponsorship had equipped agriculture, the electric industry and the manufacturers of farm machinery with tools and facts without which the general application of electric power to farm operations would not have been possible. This developmental work would have been done eventually in any case, but lacking the coordination and financing afforded through the C.R.E.A. program, progress would have been much slower and comparatively haphazard.

Some conception of the extent of this activity may be gained from the report on farm electrification research published in 1931 in C.R.E.A. Bulletin, Vol. VI, No. 1. It said in part:

"This survey of research, although including only a part of the active agencies, has brought to light 211 investigations connected with or stimulated by the Committee on the Relation of Electricity to Agriculture, 493 active projects in colleges, universities and the United States Department of Agriculture, related to rural electrification, 118 undertakings of an investigational nature by utilities and commercial concerns and 39 investigations in private and other laboratories. Eighty-five suggestions for new studies have also been received.

"Twenty-eight state experiment stations and a number of private laboratories, power companies and farms were visited in making the survey.

"Magazines, journals of professional societies, chemical and biophysical abstracts and the Experiment Station Record furnish an unending succession of references or at least clews indicating the location and progress of related investigations. Time has permitted the examination of only a limited number of these."

The results of these investigations had been made available through hundreds of publications issued by the associated groups (the Committee counted 300 in 1931) in addition to the C.R.E.A. Bulletins and News Letters. No. 1, Volume 1 of the Bulletin listed 227 uses for electricity on the farm and 190 uses in rural industries. The extension services of the agricultural colleges and the Department of Agriculture, women's clubs, farm organizations and the rural service departments of power companies had further aided in making the benefits of electricity known to the farm men and women over the nation. The NELA estimated in 1931 that 1000 employees of power companies were devoting part or full time to extending electric service into the country and developing the load on existing lines. Many of those rural service representatives were trained in the Rural Electric Short Courses given by the agricultural colleges with C.R.E.A. cooperation.[15]

What the Test Projects Had Shown

The operation of the test projects, notably the Red Wing line, had shown that, on farms where the potential use of power for non-draft work was large, intelligent electrification could be made to yield a dollars-and-cents profit as well as adding greatly to human comfort. But these results could justifiably serve as yardsticks for the possibilities of extending rural electric service only within certain rigid limitations.

First, no one of the projects, nor a synthesis of all of them, was typical of American farms. The Red Wing farmers, for instance, ranked well above the

[13] Following the formula recommended in 1921 by the Wisconsin Electrical Assn. See Part I, p. 14.
[14] C.R.E.A. Bulletin No. 5, Vol. 1.
[15] *Progress in Rural and Farm Electrification*, NELA, 1932.

national average in possessions and annual income at the start of the test. Certainly the average farm did not have so many profit-making operations in which electric power could be used. (Three of the five Red Wing farms on which income records were complete used milking machines, and in 1927 one-third of the total income for the five came from sale of dairy products, only a little over one-fourth from "crops and miscellaneous.")

Second, the tests were conducted under nearly ideal conditions. Experts supervised operations closely. The best equipment available was used, and most of it was freely lent, did not have to be acquired with either current cash or normal borrowing power. For the five farms cited, the value of equipment installed was $16,668, an average of $3,334 a farm; wiring costs ranged from $265 to $431. A conservative estimate was—and is—that in order to make electrification really pay its way, a farmer must invest in wiring and appliances at least as much as his proportionate share of line costs. Even if distribution lines were brought to their doors, the great majority of farmers—especially in the regions where the percentage of electrification was lowest—were in no position to approach the results achieved on the test projects.

The test projects and the laboratory work conducted by the C.R.E.A. and associated agencies were, of course, only the nucleus of the advancement achieved in rural and farm electrification in the United States in the years 1924-1935, inclusive. Power companies in all sections were alert to their opportunities and obligations to serve the rural market. Every new rural line was in a sense an experiment; utility engineers and managers were constantly working to develop methods of rural construction that would give adequate and reliable service at lower cost, trying financing plans that would permit more farmers to become electric customers without jeopardizing the investment in rural and urban lines, and promoting increased farm consumption of energy. Many companies organized rural service departments; others added rural representatives to existing departments. Demonstrators traveled through rural districts, often with elaborate exhibits, and appliance sales campaigns were directed at the farm market by utilities, manufacturers and dealers.

These aggressive efforts bore fruit in new thousands of farms connected to utility lines each year and—more significant for the future of rural electrification—in a steady increase in farm consumption of electric energy accompanied by a decline in cost to the farmer. The number of electrified farms rose from the 1923 count of 177,561 to 788,795[16] at the end of 1935. The total increase was 344 per cent in 12 years, at least four of which were bottom-depression years. From 1924 to 1930, inclusive, the growth was at the average rate of 38 per cent a year.

The 1935 total of electrified farms was 12.5 per cent of the 6,288,648 farms reported by the 1930 Census.[17] California, which had led the list of states at the beginning of 1924 with 23.5 per cent of its farms, now had 59.8 per cent but was in fifth place; New Hampshire led with 68.3 per cent, having risen from 11.4 per cent in the same period. Six other states had more than 50 per cent. The rank by regions was the same, with the Pacific, New England and Rocky Mountain groups still in the forefront. All regions had advanced, although the Southern states, with low average income per farm and a high percentage of tenant farmers, in general lagged behind the rest of the country; of the 16 states still having less than five per cent electrification (as compared to 34 states in this category 12 years earlier) 14 were in Southern regions.

TABLE II—STATES IN WHICH MORE THAN 50 PER CENT OF FARMS WERE ELECTRIFIED ON DECEMBER 31, 1935

State	Per Cent of Farms Electrified Jan. 1, 1924*	Dec. 31, 1935**
New Hampshire	11.4	68.3
Utah	12.9	61.0
Connecticut	11.3	61.0
New Jersey	3.4	60.5
California	23.5	59.8
Rhode Island	10.2	59.5
Massachusetts	7.3	57.4
Washington	18.3	57.1

* Based on 1924 Census of Agriculture
** Based on 1930 Census of Agriculture

Electric consumption on farms in the non-irrigated areas rose almost steadily through the entire period, with little regard to the depression. In 1926, the first year for which farm consumption data were collected by the NELA, the average use on farms east of the 100th meridian, where little or no irrigation was involved, was 586 kilowatt hours. In 1935 it was 873 kilowatt hours, 49 per cent more.

During the same ten-year period the average cost per kilowatt hour for the same areas declined from 8.85 cents to 5.57 cents. Thus the average farm customer in these regions, who was spending $4.32 a month for electricity in 1926, nine years later was receiving 1½ times as much power and light for $4.05.

TABLE III—FARM ELECTRIFICATION BY REGIONS

Region	Per Cent of Farms Electrified Jan. 1, 1924	Dec. 31, 1935
Pacific	20.3	53.8
New England	10.1	47.9
Middle Atlantic	7.1	34.8
Mountain	4.6	20.9
East North Central	3.1	20.6
West North Central	1.8	8.5
South Atlantic	0.6	5.7
East South Central	0.6	3.2
West South Central	0.4	2.3

West of the 100th meridian, where irrigation pumping accounted for most of the load, consumption was from seven to 10 times as great during this period, although the curve was not nearly so consistent; starting at 5882 kilowatt hours a year, the average farm use rose to 7804 in 1929, then declined to 5673 in 1935—the fluctuation being due to rainfall conditions. Average cost in this region, where many farm customers qualified for commercial rates because of large consumption, was 2.05 cents a kilowatt hour in 1926, 1.78 cents in 1935.

These desirable changes in consumption and cost were good evidence that the C.R.E.A. program, with its principal objective of increasing profitable farm use of electricity, had been sound both in conception and execution. As trends, they paralleled the history of electric service in towns by following the logical rule that increase in consumption tends to make fixed charges a smaller part of the total bill and thus reduce average cost.

Lower-Cost Lines

The difference was, that fixed charges per customer were of necessity considerably higher on rural lines than in towns. But they were not, on any comparable basis, nearly so high as they had been in the pioneer period of rural electrification, so that reduction in construction costs also had been a factor in lowering the final cost of electric power to the farmer. Rural service naturally benefited from the great technological progress made by the electric utilities during the Twenties and early Thirties in gen-

[16] EEI statistics.

[17] The 1934 Census of Agriculture reported 6,812,350 farms, but there are good reasons to believe that, through a confusion of definitions, this figure was too high by some hundreds of thousands. The 1940 Census report of 6,096,789 farms appears to bear out this assumption; otherwise the fluctuations between 1930 and 1940 would be unreasonable.

eration, transmission and distribution generally, with interconnection playing an important role. In addition, there had been special emphasis on developing lower-cost rural lines and service equipment.

Experiments in this direction had been numerous before 1924 (See Part I), but the experience with such expedients as iron wire, makeshift poles, etc.—so-called "fence-post lines"—used to bring costs as low as $150 a mile, was uniformly unsatisfactory, and few or no lines of this type were in service as late as 1930. Many companies, however, developed new rural-type construction designs which met service requirements and prevailing weather conditions while reducing total costs 25 to 50 per cent for urban averages. The Overhead Systems Committee of the NELA published in 1929 a comprehensive report, *Recommended Practices for Design and Construction of Rural Lines,* [18] based on the then current practices of companies serving rural territories and the requirements of the Bureau of Standards. Longer spans and various details of design which helped decrease over-all cost were emphasized. The use of less expensive materials for conductors, poles and auxiliary equipment was discussed in relation to durability, with this caution: "it should be borne in mind that the use of higher grade material results in longer life in general, while the use of the cheaper grade of material means shorter life and higher maintenance costs. The various factors should be evaluated and an economic balance reached in determining the grade of construction for rural lines in any particular instance."

Recognizing that local conditions must govern individual practices, the committee did not presume to set up national standards for rural lines. For the same reason, no average of line costs for the period would have real significance. The industry, as usual, pooled experience and ideas, but each company evolved a specific solution for its particular problem.

In the Pacific Northwest a survey of rural systems made in 1931 [19] revealed the most usual type of line then in operation as single-phase, 6600-volt, using No. 6 bare hard-drawn copper for conductors at costs ranging from $600 to $800 a mile. These were durable, reliable lines on which maintenance costs were reasonable, not to be classed with the merely cheap lines of some of the pioneer experiments.

Longer Spans, Labor-Saving Machinery

Span lengths on the Northwest lines were reported as averaging 275 feet, but still newer practices employed much longer spans as a principal means of reducing costs. A standard span of 450 feet was a feature of the specifications for a type of line that Puget Sound Power and Light Company was building in thinly settled areas of the same region at a total cost of little more than $500 a mile.[20] Class C poles of western red cedar, their bases treated with preservative, were used, and further important savings were made by the introduction of labor-saving machinery and streamlined construction methods. The poles, purchased from farmers and timber men in the vicinity, were set quickly by a three-man crew operating a truck equipped with hole-boring and pole-setting machinery; a light crew followed, stringing wires. Volume of work was arranged so that crews lost little time between jobs.

Similar practices brought corresponding cost reductions in other regions, though the per-mile averages varied according to service and weather conditions and probably to some extent according to the accounting methods used in allocating costs. Construction of "substantial" lines in New York State during 1930 and 1931 was reported at $900 to $1,200 a mile, as against previous averages of $1,800-$2,000.[21]

Progress had also been made in designing lower-cost service equipment for farm customers, though the possibilities in this respect were proportionately smaller. It was fairly easy to effect a considerable apparent saving by installing smaller transformers (an experiment that had been tried at least as early as 1915) but though this device had been used extensively in Europe, it was not popular in this country—the American farmer did not want his use of electricity limited so rigidly.

Progress in Financing and Rates

The rate schedules and financing plans in force in rural service in 1935 also expressed local conditions and therefore varied widely, but certain major trends had been noticeable for several years. The practice of requiring cash contributions to the initial line investment had virtually disappeared. The utilities now took all the risk, except for such protection as was afforded by contracts binding the farmer to guarantee amortization of the cost. This guaranty was usually paid monthly in the form of a minimum bill under a block rate schedule, representing 1½ to 2 per cent of the increment cost necessary to serve the customer. Schedules of this type were initiated in many states by the regulatory commissions.

Although there were at first some misgivings on the ground that penurious farmers would restrict their consumption to the amount covered by the minimum bill, the experience of most companies was that this type of rate tended to load. Compared to the demand plans, often involving multi-meter service, that had previously been tried, the minimum-bill, block rate provided in most cases a lower charge to the small user, had the important virtue of simplicity and made the advantage of larger use obvious to the customer. By the end of 1935 this plan had been so well proved that practically all the new REA cooperatives adopted it as the basis for their charges.

The Area Plan

But so long as sound economic principles governed, there was a limit to the reduction of physical costs and the liberalization of financing plans. Outside that limit were still millions of farmers who were unable to meet their proportionate share of the cost of electrifying farm districts; many of these, furthermore, conducted such simple farming operations that their potential use of electricity would never attain the minimum necessary to justify the extension of service to them. This great deterrent was overcome in part by what was known as the area plan (in New York one adaptation was called the Adirondack plan) first put into operation by some companies about 1931.

The central concept of the area plan was the electrification of fairly large rural areas as units, in much the same way that towns are electrified. Besides the inherent reduction in construction costs postulated by its advocates, the great advantage claimed for the area plan was that it permitted both construction and rate-fixing on a community basis, making unnecessary the strict allocation of costs that otherwise operated to bar the small user. This was logical to the extent that the area to be served approximated a community in its potential consumption of electricity—i.e.,

[18] NELA Publication No. 289-16.
[19] By the Overhead Systems Committee of the Northwest Electric Light & Power Assn.
[20] "Rural Lines for $500 per Mile," by M. T. Crawford, *Electrical World*, Oct. 17, 1931.
[21] "Selling Farmers Electricity on Community Basis," by Maurice C. Burritt, *Electrical World*, Oct. 17, 1931.

included an actual small community of comparatively dense population, a group of large-use farms or an industrial plant to provide a nucleus of load. Such conditions, however, were rarest in the very farming sections that were still unserved. And there was the danger that, by rigidly separating rural districts from towns in disregard of population growth patterns, the area plan might permanently deprive the rural districts of rate reductions made possible by urban advancement. Nevertheless, the area plan was hailed by enthusiasts as the panacea for which complete rural electrification had been waiting, and it was eventually made a tenet of the REA program.

Despite all these very real achievements since the establishment of the C.R.E.A. in 1923, the nationwide progress of rural electrification was not nearly so rapid as had been hoped. The farmer's lack of purchasing power remained the chief obstacle. American agriculture had entered the financial doldrums in 1920 and was just beginning to emerge when the general economic storm struck the whole nation in 1930. Farm income dropped rapidly for three years. In 1935, including Federal benefit payments of $498,000,000, the national total was little more than half what it was in 1919. Under such conditions the majority of farmers could not undertake to pay for electric lines even over a 10-year period.

Some farm leaders saw the solution in still longer-term financing, with the funds and credit to be supplied by the Federal government. Long-range public works was already an established national policy, and political support for the sponsorship of rural electrification on a similar basis was not hard to find. Agitation for enabling legislation began about 1933, and the next year the American Farm Bureau Federation and the National Grange withdrew from the C.R.E.A. to ally themselves with the new movement. President Roosevelt created the Rural Electrification Administration in May, 1935, and the first loans for constructing rural electric facilities were made a few months later. No lines financed by REA were in actual service by the end of the year, however, so that the government activity was first reflected in industry statistics in 1936. Thenceforward the development of rural electrification in the United States took on entirely new characteristics.

The year 1935, then, was the last in which the physical development of rural electrification was carried on virtually exclusively by the utility companies. (Rural extension of municipal systems was, and is, negligible.) From 1924 to 1934 the companies had the full and organized cooperation of farm associations and governmental agencies in research and educational activities.

To recapitulate, during this second period in the development of rural electric service: (1) the number of farms receiving central station electric service more than quadrupled, advancing from 2.8 per cent of theoretical saturation to 12.5 per cent; (2) average consumption in non-irrigated farm areas increased by half, although it was still only about one-seventh the average for irrigated areas, and (3) average cost of energy to non-irrigated farms decreased at least 35 per cent, while the cost of energy for irrigation, already on the level of industrial rates, also declined.

Of even more fundamental importance than these statistical measures of progress were the accomplishments in developing farm electric applications and gaining their acceptance by farmers and in making electric service more easily accessible in rural areas through the multiplication of generating plants and primary lines[22] and the development of low-cost reliable rural lines. This broadening of the rural service foundation, recognized as the greatest need at the time of the establishment of the C.R.E.A. was indispensable to further large-scale expansion under any plan.

What pace and course the development would have taken after 1935 if it had continued under private auspices, without government financing and the other elements of REA activity, is now a matter for purely academic speculation. However, a consideration of related farm facilities and economic factors is pertinent both to the status of farm electrification in 1935 and the later expansion.

Table IV shows gross farm income

TABLE IV—GROSS FARM INCOME AND FARM ELECTRIFICATION 1919-1935

Year	Gross Farm Income Millions-Dollars Amount for Year	Increase or Decrease	Electric Service	Increase
1919	$16,935	.....	100,000	
1920	13,566	—$3,369	.....	
1921	8,927	— 4,639	.....	+ 77,561
1922	9,944	+ 1,017	.....	
1923	11,041	+ 1,097	177,561	
1924	11,337	+ 296	204,780	+ 27,219
1925	11,968	+ 631	246,150	+ 41,370
1926	11,480	— 488	309,125	+ 62,975
1927	11,616	+ 136	393,211	+ 84,096
1928	11,741	+ 125	506,242	+113,021
1929	11,941	+ 200	576,168	+ 69,926
1930	9,454	— 2,487	649,919	+ 73,751
1931	6,968	— 2,486	698,786	+ 48,867
1932	5,337	— 1,631	709,449	+ 10,663
1933*	6,406	+ 1,069	713,558	+ 4,109
1934*	7,276	+ 870	743,954	+ 30,396
1935*	8,508	+ 1,232	788,795	+ 44,841

* Includes the following rental benefit payments: 1933—$278,100,000; 1934—$594,100,000; 1935—$498,000,000.

TABLE V—FARM FACILITIES TENDING TO AFFECT FARM ELECTRIFICATION
(Total Number of Farms in United States on April 1, 1930—6,288,648)

Farms having automobiles	3,650,000 or 58.0%
Farms having "door" Rural Free Delivery of mail	*2,855,000 or 45.5%
Farms having telephones	2,139,194 or 34.0%
Farms having surfaced roads	2,029,826 or 32.3%
(Of which 594,182 or 9.4% are "hard surfaced")	
Farms having water-piped dwelling	994,202 or 15.8%
(Of which 531,248 or 8.4% have water piped to bathroom)	
Farms having stationary engines	945,000 or 15.0%
Farms having tractors	851,457 or 13.5%
Farms having motor trucks	845,335 or 13.4%

Source: 1930 Census of Agriculture.

* The United States Postal Service reports 1,365,712 miles of Rural Free Delivery routes in 1933, or 45.5% of the mileage on rural roads (3,009,066 miles in 1930).

[22] On January 1, 1933, only 33 communities of over 500 population, and none of over 1,000, were without electric service, *EEI Statistical Bulletin No. 6, Table 38.* Cf. Note 5, Part 1.

TABLE VI—ECONOMIC FACTORS TENDING TO IMPEDE FARM ELECTRIFICATION

Farms having "homes valued at less than $1,000"	3,332,541 or 53.0%
(Of which 2,093,996 or 33.3% are valued at less than $500)	
Farms operated by tenants	2,664,365 or 42.4%
Farms located on unimproved roads or lanes	2,619,868 or 41.6%
Density of Farms:	
Farms located on surfaced roads (693,559 miles)	2.029,826 or 2.93% farms per mile
Farms located on other roads (2,315,507 miles)	4,258,822 or 1.84% farms per mile
(Or a density of 2.09% farms per mile for the average of all farms)	

Source: 1930 Census of Agriculture.

and farm electrification by years. The correlation of the two, especially after the onset of the major depression in 1930, is obvious; although the number of farms served increased every year, the annual increase generally followed the fluctuations of income in relative size. Table V shows the saturation of other facilities usually identified with rural progress. It may be noted that by the end of 1935 the saturation of electrification (12.5 per cent) was close to that of stationary engines, the item most directly connected with the use of electric power for farm work, and still closer to that of motor trucks and tractors, which are equipment that usually precedes the introduction of electric service. Table VI lists low-value homes, tenancy and density by character of roads—all of them impedent factors that influence farm electric service. To these may be added the generally depressed economic status of agriculture after more than a decade of low income.

AUTHOR'S NOTE: For purposes of simplicity, the distinction between rural electrification and farm electrification has not been emphasized in this account. The development of farm electric use was the most important phase of the work of the C.R.E.A., but in planning the electrification of any rural area the character of all possible users must be considered. In the eastern regions of the United States the ratio generally is one farmer to four or five non-farm rural residents, but with five to ten customers to a mile of road. In the South and West the reverse is usually true: two to three customers to the mile, all of them farmers in varying degree. Since the electricity consumption of non-farm homes is limited to domestic uses, many eastern utilities show a relatively low investment per rural customer, but are restricted in load-building, while the cost of establishing service remains the larger obstacle in strictly agricultural areas. Rural industries, such as factories, sawmills, creameries, etc., are also important where they occur, but they are neither numerous or large in the usual farming district.

Defense and the Daily Work

(*Continued from page* 408)

gram or two devoted to cooking wild duck, geese, woodcock, quail, grouse, venison, rabbit, 'possum, various fish, or what have you in your locality. Sportsmen as a class are well off and would easily pay as much for a good gun or rod as for a new range. Show the sportsman how to get real gustatory enjoyment from his skill with gun or rod and you make a real friend and customer of him. Show his wife how to clean, prepare and cook friend husband's game and you make a true ally of her. This is not easy, of course; but it IS creative home economics or home service. Success of any endeavor or enterprise may be assured only in proportion to the service which it renders the customer or client.

Don't you agree that such home economics programs prepared particularly for "use" groups have greater value in creating interest in electric cooking than unimaginative, general programs that suit nobody in particular?

Now and then, of course, the home economics program will be able to introduce within its demonstrations new menu hints, recipes and home-making ideas. These of course are all to the good, especially when interesting programs form the vehicle for such introductions.

Should curtailment of the manufacture of electric ranges (along with other appliances) become a problem resulting from defense, creative home service could keep up and increase utility load, while still demonstrating to further prospects the advantages of automatic electric cooking, by showing the customer how to save money and have better food by doing more cooking, baking and canning in the home rather than to buy at greater cost commercial baked, cooked, and canned products.

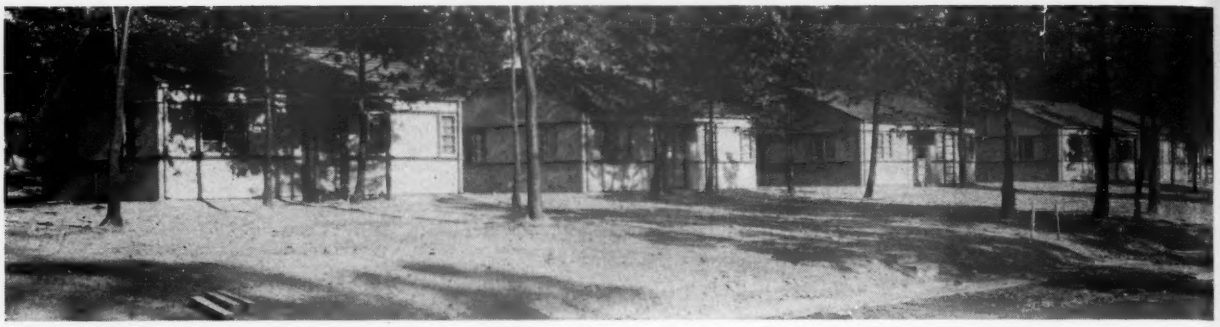
It has been stated that if one good thing can be said about the present War, it is that it has taught the women of England how to cook again. This is doubtless true. Creative home service in America, therefore, might well serve as a means of imparting to the volunteer women's organizations knowledge about emergency cooking for groups, such as is being done in England through kitchen centers and mobile kitchens. This might be a defense aid of first magnitude.

In a letter written to a friend in the United States (as published in the magazine "What's New in Home Economics") Ethel Willians, home service director of a London, England, utility company says among other things: "We are reviving a good deal of our demonstration work on the outskirts of London to small intimate audiences. Often in somebody's kitchen. Simple demonstrations, showing people how to deal with their garden produce such as 'from plot to pot,' also stressing fuel economy and finding sweets and puddings that require minimum sweetening."

There are whole sermons in that brief quotation. Contrast that with the type of gadget-boosting home economics our industry has been offering range prospects during the past few years. Then, let's resolve now to overhaul home economics procedure and reconstitute it on a truly creative basis that serves us by serving the public.

Government and defense requirements are pre-eminent today in the United States, and will be for a long time to come. The electrical industry in its triple fields of public utility service, distribution and manufacturing (aside from all present contribution to the defense structure) may well woo government benignity by putting into increasing use creative home economics as an aid to national welfare.

The home is the cornerstone of the nation. Creative home service can help set that cornerstone more firmly in the nation's physical, moral and spiritual soil.



Some of the 600 all-electric low-cost homes now occupied by aircraft workers at the Glenn L. Martin plant.

Electrical Living in Defense Housing

A NEW development in low-cost housing for defense workers, which is expected some day to make home ownership and modern electrical living convenience a reality for America's 13 million families with yearly incomes of $1,500 or less, is now under way at The Glenn L. Martin Company plant, Baltimore, Maryland.

Four thousand homes of an entirely new type, using a single thickness of wall material to replace the 8 or 10 separately applied layers of sheathing, insulation, lath, plaster, etc., commonly used in wall construction, are to be built for occupation by the Aircraft workers and their families. Approximately six hundred are either completed or under way. While these homes provide all the basic living comfort and the durability of high priced dwellings, this new method of construction conserves materials, increases labor efficiency and speed of building, and requires little upkeep. Thus, each home can be offered to Martin employees at very low rentals. The low construction costs will make it possible for these homes to be offered for sale, at some future date, in the $2,500-$3,500 price range, or even lower.

The material which comprises the complete wall of the house, including exterior and inside finish, with ample insulation against heat and cold, is Cemesto Board, a cane fibre insulation board core, sealed between two layers of a weather-, fire- and wear-resistant combination of asbestos and cement, developed for just this purpose by The Celotex Corporation, Chicago, Ill.

All-Electric Kitchens

The complete electric kitchen furnished with each house includes an electric refrigerator, range, roaster and water heater. Kitchens are planned for the housewife's convenience and easy, step-saving flow of work. Modern lighting fixtures are provided in every room.

The home is heated by an oil burner, which is submerged flush with the floor. Outside meters, and new type switch boxes which do not require fuses, are used.

The fact that electricity was chosen as the sole source of energy in these homes is of paramount importance to the electrical industry. Not only can these homes and their profitable load be duplicated in any community where housing for defense workers has become a problem; but the youths who form a very large majority of the employees now working on the Martin assembly lines, and their young wives, will become accustomed to electrical living convenience. They will desire the comfort of modern appliances in the future, and will make highly welcome customers for any electric utility.

Homes to be Permanent

"The Cemesto House is no emergency dwelling, built to provide shelter for a brief span and then destined to fall into dilapidation and disuse," said Bror Dahl-

(*Continued on page* 425)

A single thickness of wall material and simple construction methods make possible fast and inexpensive building.

Part of the all-electric equipment, and a corner of the spacious living rooms, in these new homes.

Revitalizing the Better Light-Better Sight Program

By H. P. J. Steinmetz
Chairman, Better Light-Better Sight Bureau

DESPITE the title of this article I do not mean that the broad principles and objectives of the Program, as originally set up at the beginning of the movement eight years ago, are to be changed in any way. There is no need for that. Those principles and objectives are as vital and essential today as they were then and since maintained through the seven years intervening.

What I do mean is that the interests and activities of those groups and organizations, that at the beginning were most active in promoting the Program and keeping the educational aspects of the Better Light-Better Sight movement constantly in the forefront of all local plans, are apparently in need of rejuvenation. Specifically—the utilities.

The utility companies of the country were the leaders from the beginning in utilizing the educational angle of the program in promoting and selling better lighting to their customers. Everybody agrees that the lighting end of the electric utility business has shown an extraordinary success during the past few years. Nobody will dispute the statement that the program with its main emphasis directed to education of the public on the benefits and advantages of Better Light for Better Sight has been and is the chief contribution to this excellent progress of the lighting business.

So why shouldn't the utilities continue with a program and the particular features of that program which have proved so fruitful, at the same pace and along the same lines which have been so effective in the past? A number of guesses could be cited but none of them would have any sound or reasonable justification for any let-up in carrying on Better Light-Better Sight activities in the same way and with the same force that has been acknowledged so successful in the past.

However, we in the Bureau have been cognizant for some time of a gradual slowing up of customer education as exemplified in the Program objectives in favor of a tendency to sell lighting and lighting equipment as in the old days prior to the Better Light-Better Sight movement. To combat this tendency and in an effort to keep the original objectives of the Program in the forefront of promotions, advertising and selling, the Bureau has this year intensified its activities to a greater extent than ever before. For one thing, the country has been divided into eleven regions, each with a regional Vice Chairman. These men are outstanding commercial utility operators and it is anticipated they will more closely knit operations of the Bureau with local activities.

The functions of these Vice Chairmen are mainly to intensify Better Light-Better Sight activities whenever and however possible to do so. This may include:

(a) Securing a place for some Better Light-Better Sight presentation on the program of periodical meetings held by geographical or sectional groups either by providing for a qualified speaker from the educational, optical or electrical fields or by arranging for a special session on Better Light-Better Sight as part of the program;

(b) Developing a plan of correlating and interchanging of ideas and reports among the utilities within the region;

(c) Stimulating a more active cooperation between optical, educational and electrical groups within the region on the common ground of interest—eyesight conservation.

We have high hopes that the Regional Vice Chairman plan will expand and revitalize local activities throughout the country.

For another thing, the amount and quality of materials being made available this year by the Bureau have been extended. Heading the list is the talking motion picture in full color entitled *Light Makes Sight*. Production has started and we expect to deliver finished prints on or about November first. This will be the first talking motion picture on Better Light-Better Sight and with the added feature of full color plus a theme and treatment employing the best arguments on good lighting for good seeing, this film will be the finest and most effective single item the Bureau has ever made available.

Among the other materials are the three sound slide films which are all good, timely and get across good arguments in a manner not possible in any other way.

The booklets on Home, Store and Industrial Lighting contain new thoughts and suggestions of a kind never before made available.

The newspaper advertisements and clip news sheets are of a type that does feature benefits and advantages to the customer.

The action displays are distinctive and round out any and all displays of lighting merchandise.

When this variety of sales and promotional helps is reviewed and the low prices noted I believe that most utilities will find a place for many items in local activities planned for this fall and winter.

The manufacturer members of the Bureau have produced new educational materials to tie in with our efforts to get the Better Light-Better Sight objectives in the forefront of all lighting promotions.

A re-examination of the methods now used in promoting, selling and advertising is suggested. If done, the prediction is made that most utilities will find that the methods of today are quite lacking from those of 1934, 1935, 1936 and 1937 in respect to educating the customers on what Better Light will do for them in eyesight conservation, health and efficiency. And it was in those years that we began to make our greatest strides in improving our lighting revenues.

People forget easily and it takes years of constantly pounding away with the same fundamental arguments before real progress begins. I have said it before, and you have heard it often—when we in the business become sick and tired of the same old story, then is the time when our customers are just beginning to grasp what we are advocating and begin to do something about it.

One of the principal objectives of the Program from the utility point of view

is higher lighting intensities. We have been making good progress toward that end but we are still far away with the average customer from the present-day recognized standards. Fifty footcandles is a common goal today but in the home the average is less than one-fifth of that. In the commercial field the average is less than one-fourth. Real progress is being made in the industrial field due to the influence of the Defense Program and to the attitude of Defense agencies in requiring 35 to 60 and more footcandles in buildings and offices which they are erecting and renting. The average, however, is still low—authorities say it is not over 10 to 12 footcandles.

Is there any better or more effective way of raising the lighting intensities of all these classes of lighting application than by constant education of our customers of the benefits and advantages of good lighting—those arguments and promotions which are the very heart of the Better Light-Better Sight Program?

Another thing worthy of mention is the steadily increasing interest in Better Light for Better Sight by educators, health authorities and members of the optical professions. Many in those groups, but none with any commercial stake in lighting, are contributing to the educational aspects by frequently pointing out the value of proper lighting and its close relationship to good seeing. As an example, take the whole day session of the last annual convention of the American Optometric Association devoted entirely to Good Lighting as related to Good Vision. Take the address of Dr. Wm. Feinbloom, Director of the Public Health Bureau of AOA, at Chicago last spring when he told of the 250 local Health Bureaus around the country that would include good lighting in their local activities and who would welcome cooperation of the local lighting interests.

Hygeia and *Sight Saving Review*, two important publications read widely by doctors, health and welfare groups, nurses and school officials, include some article or constructive reference to good lighting in nearly every issue published these days.

These are just a few of the many instances in which important groups and individuals allied in promotion of Better Vision and eyesight conservation are doing something directly for the benefit of the utility and lighting industry.

How much in turn are we in the utility business doing of like nature for the benefit of those groups and professions? How much are we neglecting such splendid opportunities to help our own business by more active cooperation with all groups and individuals that are concerned in some manner or other with bettering seeing conditions?

It is well worth while to look into some of these matters. If this is done, I am confident the Better Light-Better Sight movement will receive a new impetus and a revitalization that will prove profitable to all utility operations.

Regional Vice-Chairmen of Better Light-Better Sight Bureau: 1. A. V. S. Lindsley. 2. B. A. Seiple. 4. O. M. Jackson. 5. C. L. Dunn. 6. H. A. Keys. 7. M. R. Rodger. 8. A. A. Brown. 9. G. B. Buck. 10. R. C. McFadden. 11. R. B. McElroy.

An Experience With High Dielectric Losses In Old 24-KV Cables

By G. B. McCabe
Detroit Edison Company

Presented before a meeting of the Transmission and Distribution Committee, EEI, Cincinnati, Ohio, Oct. 20-22

A CASE of overheating occurred this summer in Lycaste Avenue just outside of our Conners Creek Generating Station in a 16-duct (4-in. fibre) run containing eleven 3-conductor, 24-kv cables, of which seven were 2/0 size and more than 20 years old and the other four 350M cir mil about 15 years old, installed as shown in Fig. 1.

The territory traversed by these cables was formerly a marsh which was filled in with refuse material from dump trucks prior to the construction of the generating station. The concerned duct bank is located under a brick pavement.

It should be noted that seven of the 11 cables are more than 20 years old and that all were impregnated with a comparatively high-loss compound consisting of 80 to 100 per cent of black petroleum grease (a petrolatum) and 20 to 0 per cent of water white rosin. This high loss becomes predominant at temperatures in excess of 60 C.

Not only had there been an increase in cable loading and an unusually early hot and dry summer this year which further heated the already baked-out ground, but the loading on this duct bank became unbalanced and Trunk Lines 523A and B overloaded on account of a four-day shutdown, July 28 to July 31, due to a series of cable faults on parallel Trunk Lines 524A and B in an adjacent duct run. During the month of July, the 2/0 cables of Trunk Lines 523A and B had been carrying an average 24-hour load of well over 100 amp, the peaks reaching as much as 175 amp per cable. During the shutdown of 524A and B, maximum sheath temperatures in excess of 65 C for several days and loads of 195 amp were attained on 523A and B.

By shifting some of the load on these cables to other lines and stations, it was believed that relief could be effected. Unfortunately, this did not prove to be the case for the whole bank had become so heated as to force the cable temperatures into the danger zone where the vicious cycle begins of high temperatures increasing the dielectric losses which in turn produce higher temperatures, ad infinitum.

As a consequence, sheath temperatures continued to rise, not only the vacant duct ("V") temperatures passing well over 50 C but the sheath temperature of Trunk Lines 537A and B reaching a value of about 80 C before it was shut down on August 14, although the average load per 2/0 cable of this line during the previous 24 hours was only 75 amps.

The remedy consisted of replacing four sections of each of the 2/0 cables of the four hottest lines, viz., Trunk Lines 523A and B and 537A and B, with 350M-cir mil cables on August 12 and 15 respectively. Nevertheless, although these 350M cables carried but the load normally imposed upon 2/0 cables, i.e., from about 75 to 130 amp, the sheath temperatures of these newly installed 350M cables immediately rose to 60 C and, although in the meantime, on August 18, ventilating covers were placed on some of the manholes, it was not until the first week in September that the bank had cooled sufficiently to drop the sheath temperatures to the comparatively safe values of 45 C.

Having removed 16 lengths, equivalent to about a mile, of 2/0 cable and realizing that priorities, etc., make it essential to save every foot of usable cable, steps were taken to determine the reusability of the removed sections.

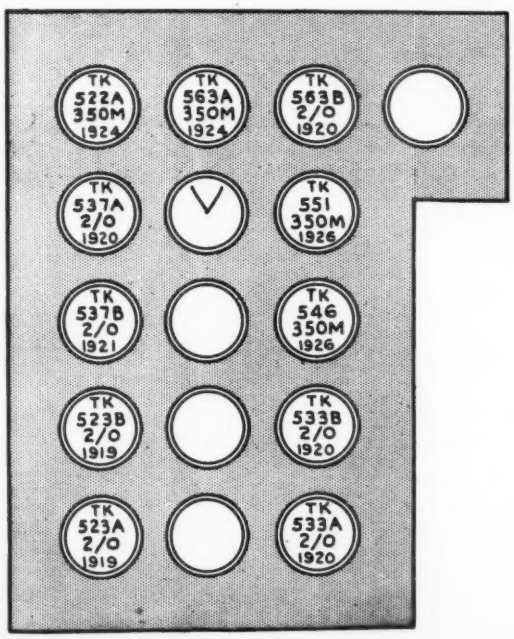


Fig. 1—Section of Duct Bank.

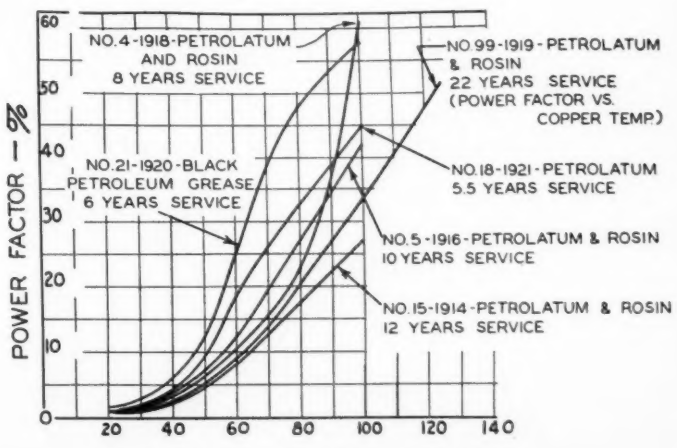


Fig. 2—Cable Temperature Centigrade.

These steps consisted of tests of power factor-temperature characteristics on a couple of reel lengths representative of the lot.

The cable with the three conductors shorted at one end was heated with 3-phase current until the copper reached 125 C (as determined by resistance measurements) at which point power factor readings at normal line voltage to neutral (15 kv approximately) were taken between each conductor, taken in turn, and the other two grounded. Additional power factor readings were taken at temperatures of 104, 81, 70, etc., as the cable cooled, thus giving the data for Curve No. 99 on Figure 2. Temperature readings taken at various points on the outer two turns of cable on the reel indicated an average sheath temperature of about 80 C when the copper temperature reached 125 C. Thus, the top power factor of 51.5 per cent should be considered as that for a cable having an average temperature of the insulation of about 100 C.

In October, 1928, the author presented before the Underground Systems Committee, NELA, at Philadelphia, a "Report on 'Before and After' Service Tests of Power Factor on 53 Samples of 24-kv Paper and Lead Cable." The curves of the power factor-temperature characteristics of five samples of typical cable manufactured in the period between 1914 and 1921, thus embracing 1919 when the concerned length No. 99 was made, are reproduced in Figure 2 for purpose of comparison.

The five samples are representative of cable manufactured during that period, many miles of which are still operating satisfactorily and will continue to do so, it is hoped, on our 24-kv system. It should be noted that the 1928 tests were conducted on 15-ft samples in which the whole wall of insulation was at a uniform temperature for each power factor reading. If a curve of power factor vs average temperature of the insulation (instead of copper temperature) were visualized as superimposed onto these curves, it would be seen that such a curve would reveal the power factor values for the concerned reel of cable to be no worse than those for cables still rendering satisfactory service.

In view of these findings, all of the above removed cable was returned to stock for immediate and future use in normal service on our system.

Reference to the dielectric loss curves

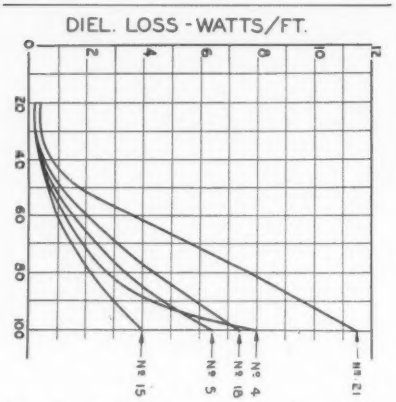


Fig. 3—Cable Temperature Centigrade.

shown on Figure 3 reveals that at 80 C cables made prior to 1922 have dielectric losses of about 4 watts per ft. Since the average temperature of the insulation of the 11 cables in the duct bank in question was undoubtedly of the order of 80 C or more, the dielectric loss alone must have amounted to 40 to 50 watts per ft, which is considerably more, probably 150 to 200 per cent, than the total copper loss developed at that time.

This whole case, therefore, was the result of a combination of a hot, dry, early summer tending to bake out the ground sooner than usual, an exceptionally large number of cables in one street built on refuse-filled ground, and such heavy overloading of a pair of old high-loss type cables, due to a series of failures on sister cables in another run, that the duct bank and cable temperatures reached the point where the dielectric losses become accumulative.

New Cable Fireproofing Material

By E. F. Neuzel

Cincinnati Gas & Electric Co.

DUE to corrosion difficulties experience on the Cincinnati Cable System caused by cement fireproofing, a new type of cement-like fireproofing material called "Cablekrete" was developed by George A. Lineback, chemist of the Cincinnati Gas and Electric Company in collaboration with Sakrete, Inc., of Cincinnati, Ohio.

A good fireproofing material should have the following qualities:

Fireproofing Properties: First of all it must, of course, have good fireproofing and arc resisting properties. This material will not spall and expose the lead sheath. On the contrary, it fuses at high temperatures and remains intact. Laboratory samples heated to red heat have withstood plunging into cold water without disintegration.

Corrosion Properties: Its composition must be such that its hydrolysis products do not attack the lead sheath. "Cablekrete" can be applied directly to the naked lead sheath of the cable without any corrosion effects.

Elasticity: A fireproofing material must have sufficient elasticity to enable the material to follow the normal cable movements attendant with heating and cooling cycles. "Cablekrete" adheres tenatiously to the lead sheath. Bending tests show only the appearance of hair-line cracks in the surface of the coating.

Ease of Application: "Cablekrete" is a dry powder to which water is added in the field to make a mixture of mudpie consistency. Properties of adhesion are such that it will stick to the under side of the lead cable sheath without falling. Tests have shown the wet adhesive force to be approximately 200 grams per sq in.

Three men can fireproof 150 ft of 2½-in cable with "Cablekrete" per day with an application of approximately ½ in to ⅝ in thick.

An 80 lb bag of "Cablekrete" will take care of approximately 15 ft of cable. An application of cheese cloth in strips 4 in wide is placed around the outside of the fireproofing to prevent the newly applied material from falling off due to street vibration during setting up. In some applications the cheese cloth might even be dispensed with.

General Properties: "Cablekrete" will stand prolonged submerging in water during the curing or after it has set up without damage to its properties. It can also be removed very readily with a hammer if necessary.

Two years experience with this material on the Cincinnati Gas and Electric system has shown this material to fulfill the above qualities.

Electrical Equipment Committee Meeting

R. W. Wilbraham, *Chairman*

THE fall meeting of the Electrical Equipment Committee was held in Cleveland, Ohio, October 13 and 14, with about fifty engineers in attendance. All of Monday, together with the Tuesday morning session, was devoted to a closed meeting, in which problems arising out of the national defense situation were discussed.

The reaction on personnel problems of the utility companies occasioned by the selective service law was reviewed and the experience of different companies was related by several members.

Rehabilitation of equipment and "self help" within the industry, as a means of alleviating the procurement problem, was reviewed in a round table discussion. A further session Monday evening was devoted to the priorities matter, at which Mr. J. A. Krug, of the Office of Production Management, presented a discussion of the problem in relation to the utility industry.

Special problems of maintaining equipment occasioned by present unusual operating requirements were reviewed and appropriate means for meeting the situation were discussed. Particular attention was devoted to the question of power supply for national defense requirements.

A formal report covering 93 cases of equipment trouble during the period of February through August, 1941, was presented by Mr. F. S. Brown. Among major troubles reported most frequently were those involving lightning arresters (8), bushings (6), oil circuit breakers (6), large transformers (4), and regulators (4). Among minor troubles those occurring most frequently were regulators (10), oil circuit breakers (5), constant current transformers (5), synchronous converters (4), disconnecting switches (4). A number of cases of trouble of particular interest were described in detail.

On behalf of Mr. Philip Sporn, Mr. H. P. St. Clair discussed the results of some field tests on a 138 kv outdoor air-blast circuit breaker. This was accompanied by a motion picture record of the test. Field and factory tests on 13.2 kv indoor air-blast circuit breakers were described by Mr. Nicholas Stahl. These air-blast circuit breaker tests were of particular interest because of the high capacity of the breakers involved.

Mr. R. T. Henry reminded the committee that the ASA Alternating Current Power Circuit Breaker Proposed Standard had been made available to the industry in February, 1941, for one year's trial use. Since the trial period is growing short he suggested that members who had comments or criticisms should submit them to ASA Headquarters for use when revision of the Standard is undertaken.

Mr. Harold E. Gove presented, on behalf of Mr. Stanley Stokes, a report on suggested capacity definitions relating to electric power systems. The report pointed out that existing terms and definitions were employed, in so far as possible, and that no attempt had been made to develop entirely new fundamental definitions. The members were requested to review these definitions carefully and to send their comments to Mr. Stokes.

The reconstruction of City Dock Substation in Newark, New Jersey, was described by Mr. P. H. Adams. He pointed out that the elimination of fire hazards, increased rupturing capacity for the circuit breakers, and sectionalizing of the buses in case of faults were the principle objectives in this work. With the exception of oil circuit breakers on the secondary side of the transformer banks, all circuit breakers used were of the air De-ion type.

An interesting installation of large variable speed magnetic couplings at the Oswego Station of the Central New York Power Corporation was described by Mr. R. T. Henry. He pointed out that the principle advantages of these couplings are that they permit the use of a simple squirrel cage induction motor, provide an infinite number of speeds with quick response to changes in the control system, and make available a speed range from 10 to 100 per cent of full speed. While this principle is not new, the installation is of interest because of the large size of the motors controlled, ranging up to 4 induced draft fans of 1250 HP each.

At the May meeting of the Electrical Equipment Committee recommendations were made by the Transmission and Distribution Committee as to single phase utilization voltage spreads. By letter ballot these measures have been approved by the Electrical Equipment Committee for use as a proper basis for design and rating of single phase apparatus and for use by the Joint Committee on Preferred Voltage Ratings in setting up utilization equipment standards for single phase apparatus. Further work is now in progress by the Transmission and Distribution Committee to determine values of utilization voltage spreads on 208 and 240 volt circuits.

When recommendations with respect to these voltages are received by the Electrical Equipment Committee they will be used in the determination of preferred and maximum voltage spreads which will be suitable for use as a basis for design and rating of three-phase equipment.

On behalf of Mr. R. A. Hentz, Mr. J. H. Foote presented a progress report on activities of the EEI-NEMA Joint Committee on Preferred Voltage Ratings. This committee held its first meeting in February, 1939, at which time it was decided to await the results of the study of utilization voltage being made by the Electrical Equipment and the Transmission and Distribution Committees. Since this work appears to be coming to a conclusion, a second meeting of the Joint Commitee was held last month, at which several working groups were formed to carry out certain preliminary work, to the end that a new schedule for preferred voltages can be issued to the industry as promptly as possible after the completion of the study of utilization voltages.

Mr. Foote reported that the Joint Committee on Motor Starting Currents had prepared a statement of the problem and drafted a proposed rule for single phase motor starting current limitations designed for general adoption in the industry. It is expected that this will be approved by the Joint Committee in the near future, after which a letter ballot will probably be circulated to the electricity supply companies, inquiring whether they will join in industry endorsement of the rules, and also whether they will join in applying the rules through their company regulations.

Mr. Silver reported on the recent meeting of the Meter and Service Committee in Swampscott. A complete report of this committee appears elsewhere in this issue of the BULLETIN.

The work of the Foreign Practice Group was discussed by Mr. DeBeech, who stated that despite present difficult conditions a certain amount of work is going forward.

Twelve foreign correspondents located in eight different countries in Europe and South America are cooperating this year.

Meter and Service Committee Meeting

F. E. DAVIS, *Chairman*

SUBSTANTIAL progress on the various activities of the EEI Meter and Service Committee was reported at the fall meeting of the Committee, held jointly with the meter committee of the AEIC at Swampscott, Mass., October 1 - 3.

Watthour Meters and Defense

One session was devoted entirely to a discussion of the importance of the watthour meter to the utility industry and the present situation.

Mr. O. K. Coleman summarized the joint efforts of the EEI and the AEIC Meter committees in their endeavor to obtain better priority rating for the watthour meter, related equipment and repair parts, including the committee's joint resolution and supporting data supplement presented to OPM. Mr. Coleman also discussed the new order P-46 of OPM and its relation to the procurement of metering equipment.

All the manufacturers present including not only the meter manufacturers but manufacturers of related equipment including service entrance devices expressed their views of the present situation and on the whole painted a rather dark picture.

There seems to be no doubt that production will be radically curtailed in the near future unless higher priorities for meter equipment are immediately available. The A-10 rating available under P-46 should be immediately applied as widely as possible since "time is of the essence" and it is anticipated that the A-10 rating will be valuable only for a comparatively short period. The consensus of opinion among the manufacturers seemed to be that the stage has almost been reached when a suitable priority certificate will be necessary with all orders before delivery can be made and one manufacturer's representative stated that this was already necessary with his company.

Mr. Alexander Maxwell of EEI headquarters discussed briefly the activities of the EEI in the endeavor to obtain necessary equipment. In his discussion he stated that the suggestion had been made, and that he was passing it on to all the technical committees, that an exchange of information between companies relative to materials, devices and equipment, at present in stock and for which there is no immediate or near future requirement, would be valuable, since these particular items may be immediately usable by some one else in place of items not immediately procurable from manufacturers. This may be particularly applicable to the meter divisions and resulting trades or sales of value to both parties. For instance, some companies have stocks of 5 amp. 2 wire meters that have been displaced from service and are not immediately usable because they are not suitable for present conditions of service and for which future use is very doubtful. Others may have demand registers that have been displaced from service and many other miscellaneous items which they may wish to dispose of after individual negotiations.

A joint committee of one of the two meter committees was appointed to determine the most practical means of accomplishing this objective after it was generally agreed that such procedure would be helpful.

Several members also briefly discussed methods which they have used to recondition meters not immediately usable such as the 5-amp. 2-wire types, by converting them to higher capacity either 2 or 3 wire so that they could be used.

The committee expects to continue its efforts to do all possible to maintain a sufficient supply of meters for essential purposes. The continued cooperation of all users of meters in this effort will be necessary and any orders for meter equipment not actually required on delivery, placed with the manufacturers, will merely serve to further confuse the situation. The committee has suggested that orders for future delivery against real anticipated needs should be placed now for as far into the future as practicable. This will materially aid the manufacturers in obtaining the required raw materials.

Current Transformers

As was reported previously, agreement has been reached as to nominal ratings, insulation classes and dimensions for indoor, dry, wound (primary) type current transformers. The values agreed upon were included in the minutes of the meeting in Chicago last May and should be familiar to those interested. The four major manufacturers of instrument transformers have now agreed to abide by the recommendations of the committee and expect to have current transformers available in accordance with them as soon as practicable.

The committee has been requested to extend this subject to include bar type transformers in the same general types and the subcommittee will undertake a study of these units.

Parallel to the work of this subcommittee the ASA-C-57 Sectional Committee on Transformers has also undertaken a revision of Section IV of C-57 dealing with instrument transformers and it is hoped that the recommendations of the Meter and Service Committee will be closely coordinated with those of this group.

Demand Meters

The work of the committee with respect to block interval demand registers is now about complete and a tentative standard agreed upon.

Service Cable

Progress in this subject has been held up because the cable manufacturers have been so busy with defense work that it has been practically impossible to devote much time to service cable development. It is generally agreed that the present multiplicity of types of service cable available is not at all commensurate with the requirements for such cable and that most of the present types can be eliminated with possibly one or two types remaining, these to be manufactured in a minimum of sizes. In order to accomplish this, however, it will be necessary for many users to change their present practices, and changes in the Underwriters' Specifications and the National Electrical Code may be required. This will take time as well as any new developments that may be brought about but it should be realized by all users of service cable that a proper standardization and general use by them of such a standardized product will result in economy and much improved general distribution which is most important.

The subject is being actively prosecuted by the subcommittee and it is hoped that favorable action will result without a great deal of delay.

Meters

There are several active subjects dealing with meters. These include bearings, nameplates, terminal blocks, corrosion of parts, performance in enclosures, use with phase shifting devices, and use on low power factor and special types of loads such as welders.

These investigations have lead to great improvement in bearings and terminal blocks and further standardization in nameplates and phase shifting devices will result in the future. A study of corrosion is getting under way but has been somewhat complicated by present substitutions of materials and finishes.

A summary is to be made of present possibilities in the measurement of low power factor loads and the committee would be most appreciative if those contemplating special methods for this purpose would send the chairman a full discussion of what is at present proposed.

Service Entrance Devices

Meter connection boxes, sockets, multiple meter installation troughs and related equipment were discussed primarily from the standpoint of procurement and necessary substations. Steel has, of course, completely replaced aluminum and substitutions have been made for aluminum finishes on steel. Galvanneal steel is becoming increasingly difficult to obtain and even sheet steel is getting scarce. The net result is that a shortage is imminent in spite of substitutions.

The present type S fuse controversy and its importance to operating utilities was discussed briefly, it being assumed that all those interested are entirely familiar with the present situation and are well aware of the confusion in circuit protection that is bound to result; also the increased service costs and difficulties to those companies rendering fuse service on customer's premises.

The use of the automatic circuit breaker in service entrance equipment as a substitute for fuses was discussed. The cost of these devices is now quite comparable to fused type equipment.

Joint Committee on Standardization of Electricity Meters

This committee, whose formation has been previously reported, has practically completed the design of a form for presenting the standards for meters and related equipment to the industry. It is expected that all standards promulgated by the committee during its life will be put into this form when approved, and that such standards will have the approval of the Meter and Service Committee, EEI, the Committee on Metering and Service Methods, AEIC, and the Manufacturers through the Meter and Instrument Section of NEMA. In this manner they should have the full force of true Industry Standards and be available to all those interested.

New Developments by Manufacturers

The only new development presented was a new thermal demand meter. Other discussions dealt almost entirely with substitutions of material where required.

General Electric Company Dinner

The General Electric Company chose this occasion of the meter committee meetings and also a meeting of their meter specialists from all over the country to give a dinner on the evening of October 2, honoring Mr. Frank Vaughen, Manager of the Meter Division of the Company, on his completion this fall of 50 years of service to his company and the art of measurement.

It was a most delightful occasion although a serious one, for Mr. Vaughen's record of service not only to the utility industry as a whole and to his company but also as a citizen in the communities in which he has lived, was the subject of several rousing and sincere testimonials by such men as Messrs. Funk, Darling, Rohrer, Howe, Troy, Lang and Shreve, all of whom have been intimately associated with Mr. Vaughen for many years.

The Meter Committee was particularly pleased to have the opportunity of being present, for Mr. Vaughen has always taken a great interest in committee work and has cooperated thoroughly, and he has been an individual friend of each member and associate.

Prime Movers Committee Meeting

J. A. Keeth, *Chairman*

A TWO-DAY meeting of the Prime Movers Committee was held at St. Louis, Oct. 6 and 7, with the Chairman presiding.

The Chairman made appointments of members to represent this Committee on committees of American Standards Association, The American Society for Testing Materials and the National Fire Prevention Association.

A resolution was adopted expressing the regret of the Committee upon the resignation of Mr. E. H. Tenney of St. Louis as a member and also citing his valuable aid and long service in its work.

There was a long discussion on the priority situation as it affected power plant construction and operation. It was led by Mr. Alexander Maxwell of the Edison Electric Institute headquarters and Mr. John Drabelle.

Arrangements were made to have members send to Edison Electric Institute headquarters their requirements for the many chemicals needed by the various power plants of member companies, in order that the officers of the Edison Electric Institute might submit the same to OPM in Washingon, for guidance in setting up priorities.

Members of the Prime Movers Committee were requested to provide Mr. Boetcher with a statement of the size and quantity of carbon moly and Grade "B" carbon steel pipe they will order before the end of 1942.

Progress Reports were received from all standing sub-committees. The Metallurgical and Piping sub-committee reported proposed revisions in the A.S.M.E. Boiler Code affecting copper alloys and designed values for thickness of flanges and fittings. The Committee unanimously went on record as opposed to such revisions, particularly at this time.

Announcement was made of a new sub-committee of the A.S.M.E. Boiler Code Committee to study the Chemical Section of the Boiler Code and suggest revisions thereto. Mr. H. E. Miller will represent the Prime Movers Committee on this new project.

A round table discussion was conducted by Mr. J. R. Baker. This part of the meeting covered many phases of power generation problems and experiences. While some operating problems were mentioned, they were mostly of the nature of failure of equipment and it might be well to mention that the many troubles experienced by those operating high temperature and high pressure plants discussed as little as a year ago at Committee meetings were conspicuous by their absence.

Transmission and Distribution Committee Meeting

E. V. Sayles, *Chairman*

THE fall meeting of the Transmission and Distribution Committee was held at the Netherland Plaza Hotel in Cincinnati, October 20, 21 and 22. It was the first meeting under the chairmanship of the incoming chairman, E. V. Sayles of the Commonwealth and Southern Corp., Jackson, Michigan. A special feature of this meeting was two half-day sessions arranged to discuss problems arising out of the National Defense situation which no doubt accounted for one of the best attended meetings of this committee since it was formed in 1933.

In general, the meeting was conducted in accordance with the tentative arrangements for the meeting given in the September BULLETIN, a few changes being necessary on account of changes in the program following the preliminary arrangements that were made early in September.

The first day of the meeting was devoted to a program by the Underground Group under the chairmanship of T. G. Hieronymous of the Kansas City Power and Light Company.

Experience with High Dielectric Losses in Old 24-kv Cables was contained in a paper by Mr. G. B. McCabe of the Detroit Edison Company. This paper was based on some research work that has been carried on by Mr. McCabe's company and appears in this issue of the BULLETIN.

The 66-kv Oil-Filled Cable in Cincinnati and their Low Voltage AC Network were discussed by Mr. E. F. Neuzel of the Cincinnati Gas and Electric Company. The cable installation which Mr. Neuzel described consists of 500,000 cm single conductor hollow core oil-filled cable insulated with 330 mils of paper and sheathed with ⅛ inch copper bearing lead. Mr. Neuzle's discussion covered a typical cross section of the conduit system and dealt with such problems as pulling tensions during installations and problems due to the topography of the location where the cable was installed due to a difference in elevation of 215 feet between the ends of the cable. This required that the cable be divided into 30 oil sections to obtain a hydro-static pressure limit of 15 pounds per square inch.

The Low Voltage AC network installation is served by seven 13.2-kv three-conductor primary cables with 400,000 cm single conductor paper-insulated lead-covered secondary mains. This network system supplies an area in downtown Cincinnati of about two square miles, and serves a load of approximately 32,000 kva. There are 75 underground vaults of from one to four units capacity with a total transformer capacity of approximately 50,000 kva operating at a load factor of 65 per cent. The transformers and protectors are of subway construction in the high-water area and vault type in other areas. The transformers are protected with temperature-pressure relays and an autocall system. Positive nitrogen gas pressure is maintained above the oil level.

Mr. A. S. Brookes of the Public Service Electric & Gas Company gave a progress report on the work he has been doing in preparing a series of papers and discussions previously presented on cable-sheath corrosion in form for publication. These papers were presented at a meeting of the Underground Group at Chicago in May, 1940, and their preparation in form for publication has involved a large undertaking on which Mr. Brookes has been working since that time. Action was taken by the Transmission and Distribution Committee authorizing the publication of these papers and discussions.

An interesting report was presented by Mr. W. F. Davidson on "Emergency Type" High Voltage Cable Joints. This development was undertaken at the direction of the Cable Engineering Section of the Committee on Power Distribution of the AEIC of which Mr. Davidson is chairman. The purpose was to develop, if practical, a joint for high voltage cables which could be constructed without the necessity for making a lead wipe and which would have sufficiently good electrical properties to permit its use in making temporary joints for service restoration in emergencies. Of seven different compounds found to have some promise for use in this development, two were finally selected which were considered to be sufficiently satisfactory to justify making trial joints. The results of this development are promising and while the two compounds that have proved most suitable, are not commercially available in large quantities, they may be obtained in smaller amounts on reasonable short notice and unless the situation changes should be available in larger quantities in a few weeks time.

A preliminary report of the Subcommittee on Low Voltage AC Networks was presented by Mr. A. Bodicky of the Union Electric Company of Missouri. Mr. Bodicky has accepted, within the past few months, the chairmanship of this Subcommittee and is endeavoring to obtain low voltage AC network data from operating companies covering the years 1938, 1939 and 1940. Mr. Bodicky had compiled data taken from questionnaires returned by 68 companies operating 251 individual networks in 144 different localities. Since the data in the 1936-1937 report (EEI Pub. No. G 1) was obtained, individual network areas have increased from 221 to 251. In this change are 32 subdivisions and 26 mergers of previously reported areas, with 48 new areas reported and 27 dropped because no report was received, leaving a net increase of 28 areas. A total of 69 companies reported on 144 localities or cities, with a reported area of 120 square miles.

Mr. M. W. Ghen of the Duquesne Light Company presented a report covering information obtained by a subcommittee, of which he is chairman, which is studying Non-Inflammable Liquid Filled Transformers. Under consideration at the present time is an investigation into the operation of air-cooled transformers with Class "B" insulation. A recent estimate as to the present day use of this type of equipment shows the total kva manufactured to date exceeds 150,000 kva. Full information on this equipment is not yet available but a substantial growth in the use of this type of transformer is indicated. Mr. Ghen expects to report at a future meeting on the advantages and disadvantages of this type of equipment and on the applications which have been made of it up to the present time.

A report was made covering the preparation of a Specification for Impregnated Paper Insulated, Lead Covered Cable, "Solid" Type-Simplified Practice Schedule. This had been prepared by the Cable Engineering Section of the Association of Edison Illuminating Companies, and published on recommendation of the Committee on Power Distribution of the AEIC. This specification covers cable types and sizes closely correlated to the requirements of the industry and its present general usage. The three chief benefits that are anticipated from the use of this specification are, better deliveries, savings in cost to the indus-

try and improved quality. Mr. Davidson, who presented the report, was of the opinion that this should prove applicable to the needs of small as well as large users of cable. Obviously, the specification could not cover all special requirements nor those cases for which the total industry demand is small. For these situations, the 6th Edition of the specification entitled, Specifications for Impregnated Paper Insulated, Lead Covered Cable "Solid" Type (November, 1937) should be used.

In addition to the above-mentioned papers and reports, progress reports were made by Mr. J. A. TenBrook on Investigation of Cable Temperatures, and the Training of Cable Splicers and Helpers; E. W. Oesterreich on Economic Justification of Increased Cable Ratings for War Industry Loads; the 1940 Cable Operations Report by A. B. Campbell; and, Inspecting Impregnated Paper Lead Covered Cable, L. I. Komives.

The session on Tuesday forenoon was purposely scheduled to be a short meeting to allow subcommittees to hold subject sessions. Three subject sessions were held at this time as follows: Subcommittee on Street Lighting, O. K. Cornell, Chairman; Subcommittee on Utilization Voltages, C. E. Arvidson, Chairman, and Subcommittee on Tree Clearance, G. D. Blair, Chairman. During the time that the entire committee was in session on Tuesday forenoon the Plant Coordination Group, under the Chairmanship of Mr. H. A. Dambly discussed the various problems of this group. An outline was presented by Mr. Dambly covering the procedure followed in coordinating the activities involving plant coordination. Also brief reports concerning the completion of the revision of the National Electrical Safety Code were given by Messrs. E. V. Sayles and A. B. Campbell.

An outstanding feature of this three-day meeting was the Special Conference on Electrical System Problems in the National Defense Program. This special conference started with a luncheon on October 21, and was presided over by Mr. H. P. Seelye, Detroit Edison Company. Mr. C. W. Kellogg, President of the Edison Electric Institute, was the luncheon speaker with an address on the National Power Situation. This was followed by a meeting of the committee during the remainder of the day at which addresses were made as follows: The Priority Situation, Col. H. S. Bennion, Vice-President and Managing Director, Edison Electric Institute; Expanding Electrical Systems for Defense Needs, S. M. Dean, Detroit Edison Company; Emergency Capacity and Distribution Systems, T. G. Hieronymous, Kansas City Power & Light Company.

The program of the Special Conference included the forenoon of Wednesday, October 22, at which time Frank E. Sanford, presided while several problems in electrical distribution relating to national defense were discussed. This program included two papers, one entitled Pole-Line Hardware—Steel and Zinc Substitutions by E. H. Kendall, Commonwealth and Southern Corporation, and the other, Salvage Operations and Reclamations by K. C. Campbell, The Detroit Edison Company. Mr. Kendall who has been active for the past few years on pole-line hardware standardization by the Transmission and Distribution Committee, described the situation with respect to the difficulty of procuring the metals used in ordinary times and discussed the possibility of substitutes for zinc as a protective coating. One of the objects of Mr. Kendall's paper was to bring to the committee a summary statement of the present situation regarding steel and zinc and the progress to date in developing substitutes for them in the uses normally made in distribution practice.

The paper by Mr. K. C. Campbell contained a general description of the salvage operations of The Detroit Edison Company through which a great deal of useful material such as wire, cable, hardware, equipment, etc., is reclaimed for future use. Mr. Campbell had with him a number of samples, photographs, blue prints and specifications illustrating the processes developed by his company and which were available for review by those interested.

In addition to these two papers, reports were submitted during this meeting on Line Insulators by G. E. Dean; Weather-proof and Rubber-covered Copper Wire by H. A. Enos; poles, cross-arms, and wood preservatives, by J. A. TenBrook and a general discussion by all members on the subject of substitutions for materials difficult to obtain.

The afternoon meeting on Wednesday, October 22, was given over to papers and reports under the Overhead Distribution Group, under the chairmanship of Mr. G. E. Fiedler, Rochester Gas & Electric Corporation. Reports by Mr. A. E. Silver, Ebasco Services Inc., on Distribution Transformers in connection with which was shown a motion picture film showing the results of transformer mounting tests made by the Connecticut Power Company. Reports were also submitted by Messrs. O. K. Cornell, Chairman of the Street Lighting Subcommittee and by C. E. Arvidson, Chairman of the Utilization Voltage Subcommittee. In addition to these, two interesting papers were presented as follows: Direct Mounting of Pole Supported Distribution Transformers by F. E. Sanford, Cincinnati Gas and Electric Company, and Protection of Distribution Lines by Service Restoring Devices and Fuses, by F. W. Lincks, of the General Electric Company. Both of these papers were excellent presentations which it is understood will be available through the technical press.

Electrical Living in Defense Housing

(*Continued from page* 416)

berg, President of Celotex Corp. "It is a durable structure, designed and constructed for long life and comfort . . . when the nation's major problem will be the transition from industrial production for war to production for peace, there will be need for peacetime industry to cushion the letdown in armaments manufacture. In this task, the low cost house will play a leading role. It may even be the star of the show."

Glenn L. Martin, President of the Martin company, said that the new village of small homes will be expanded to provide abodes for his entire personnel. When his employees total 45,000—a figure soon to be reached—there will be 125,000 people living in these homes, and will form the second largest town in Maryland.

Mr. Martin expects the post-war demand for aircraft to provide sufficient business to keep his entire plant at top production, and has therefore placed the new employee villages on a permanent basis.

The particular structural design used at the Martin development was perfected by the John B. Pierce Foundation of New York, a non-profit organization, and further information concerning them was presented at the Convention of Edison Electric Institute last June.

The entire construction has been so carefully worked out that there is no interference with existing crafts in the construction field. Only mill work is done before delivery to the building site. All assembly and other steps are done at the job site.

Each home consists of a living room, hobby room, dining alcove, two bedrooms, kitchen, linen closet and bathroom. The comparatively large size of the rooms, with plenty of light and air from the extensive window area, gives these homes an appearance of comfort and charm that speaks well for their future sales.

We shall be hopeful that the design for electrical living in this group of homes will be a pattern to be adopted in many thousands more to follow.—J.H.R.

Regional Vice Chairmen Are Appointed By Better Light–Better Sight Bureau

ELEVEN outstanding utility executives in as many sections of the country will serve as Regional Vice Chairmen of the National Better Light-Better Sight Bureau, according to an announcement by H. P. J. Steinmetz, Chairman of the Bureau.

Ten of the new vice chairmen, with their positions, companies and territories, are listed herein. The eleventh executive will be announced shortly.

This action is another step in carrying out the Bureau's program of intensified promotional and educational activity, in the effort to bring to a wider public a more lasting appreciation of the relation between proper illumination and easier seeing. A more closely knit method of operations of the Bureau, which will keep the broad principles of Better Light for Better Sight continuously in the minds and activities of utility operating men and others promoting lighting, is expected to be one result of this expansion of the Bureau's organization.

The function of each Regional Vice Chairman will be to intensify Better Light-Better Sight activities throughout the region, whenever and however possible to do so.

The Regional Vice Chairmen of the National Better Light-Better Sight Bureau, their positions, companies and territories, are listed below.

Regional activities will get under way at the earliest possible moment, because of the pressing need for better illumination under present conditions. The imperative demand for maximum production in defense industries is speeding up the improvement of industrial lighting generally, since manufacturers no longer can afford the slower and less accurate work and the higher rate of fatigue that accompany poor lighting. Government-

REGIONAL VICE CHAIRMAN	STATES
A. V. S. LINDSLEY, Vice President, The Connecticut Light & Power Company, Waterbury, Conn.	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
B. A. SEIPLE, Vice President in Charge of Sales, Jersey Central Power & Light Company, Asbury Park, N. J.	New York, New Jersey, Pennsylvania
(Regional Vice Chairman for this region to be announced.)	Delaware, Maryland, Virginia, West Virginia, Tennessee, North Carolina
O. M. JACKSON, Sales Promotion Manager, Georgia Power Company, Atlanta, Georgia.	South Carolina, Florida, Georgia, Alabama, Mississippi
C. L. DUNN, Vice President in Charge of Sales, Ohio Public Service Company, Cleveland, Ohio.	Michigan, Ohio, Kentucky, Indiana
H. A. KEYS, Manager of Promotional Sales, Northern States Power Company, Minneapolis, Minn.	Wisconsin, Minnesota, North Dakota, South Dakota
M. R. RODGER, New Business Manager, Middle West Service Company, Chicago, Illinois.	Illinois, Iowa, Kansas, Nebraska, Missouri
A. A. BROWN, Vice President in Charge of Sales, Oklahoma Gas and Electric Company, Oklahoma City, Okla.	Arkansas, Louisiana, Texas, Oklahoma
G. B. BUCK, Vice President & General Commercial Manager, Public Service Company of Colorado, Denver, Colo.	Wyoming, Utah, Colorado, New Mexico, Arizona
R. C. MCFADDEN, Sales Manager, Southern California Edison Company, Ltd., Los Angeles, Cal.	California, Nevada
R. B. MCELROY, Sales Manager, The Washington Water Power Company, Spokane, Wash.	Washington, Oregon, Idaho, Montana

In this action display, the Professor's arm with pointer moves up and down, directing attention to each word in turn. His eyes roll. At the tip of the pointer is a lighted bulb. Full details of the sizes, prices, etc., of these and other displays are available in a plan folder, which will be sent upon request.

As the cat's large green eyes move from side to side, he waves his tail from left to right, focusing attention on the lamps at each side of this display—one of the several prepared by the Better Light-Better Sight Bureau as part of its new promotional program, for effective use by utilities and dealers during 1941-42.

financed defense plants, for example, call for anywhere from 35 to 60 footcandles of light.

Home lighting needs are no less urgent, as the high percentage of selectees rejected because of visual defects bears witness.

Sufficient orders have already been received by the Bureau to allow production to start on its new full color, talking motion picture on Better Light. This film stresses the need for modern lighting equipment in schools, offices and homes, and can be shown on the 16 mm. sound projectors now available in most schools.

Three sound-slide films on residential, commercial and industrial lighting, new consumer booklets, action window and counter displays, such as those illustrated, newspaper advertisements and other promotional aids complete the program prepared by the Bureau for use in 1941-42.

A plan folder, with sample copies of the promotional materials, prices, etc., can be obtained upon request to the Better Light-Better Sight Bureau, 420 Lexington Ave., New York City.

Canadian Utilities Pool Tools for Defense

HOW Canadian power companies organized their own equipment-lending service to increase production was told by W. C. Mainwaring, head of the merchandise department of the British Columbia Electric Railway Co., to members of the executive board of the Northwest Electric Light and Power Association in Seattle recently. Mr. Mainwaring, a past-president of the association, is a member of the Utility Wartime Workshop Board of Canada and promotion director of the Dominion's National War Savings Committee. S. P. McFadden, at the present time president of the Northwest Association, proposed that the Northwest organization place a similar plan in operation.

Canada was facing a serious shortage of tools, Mr. Mainwaring said. A survey of utility company machine tool equipment revealed many of the shops had machinery which was idle and the lending program immediately was established. "Today shops that were previously engaged in the maintenance of light and power equipment only are turning out orders for shipyards, munitions plants and other factories filling defense orders," Mr. Mainwaring said.

MKB's Water Heater Contest of Value to Entire Industry

SOMEWHERE in the United States, there's a vice-president in charge of sales or a merchandising manager, busily counting his electric water heater sales for the first ten months of 1941, and looking over the promotional program that has done the work—busily estimating sales for November and December.

"Yes . . . a good story!"

And so it will be—for these results of a year's work will benefit more people than he may realize. They are important from the viewpoint of the company president, who desires increased domestic load . . . profitable from the salesman's point of view, as he adds up his commissions . . . helpful to his customers, as they enjoy the new comfort and convenience of automatic hot water service . . . and valuable to the entire industry, when this information is assembled, organized and entered in The Modern Kitchen Bureau's contest for the best water heater performance during 1941 by an operating utility.

Cash Awards Not All

This contest offers, of course, substantial cash awards for winning entries, and national recognition for the men most responsible for fine records. But the reasons for the contest . . . it's value . . . and its benefits to everyone concerned with electric load building go far beyond these concrete awards.

Every merchandising or promotional executive who enters the contest has a rare opportunity to spread a whole year's work on the desk . . . to analyze advertising campaigns, sales contests, promotional ideas he has used . . . to see how he scored outstanding successes here, went down swinging there . . . to find in the merchandising history of 1941 the rules for success in 1942 and beyond, and to plan according to these tested formulae.

And when the judges' verdicts are in, each company may check the results it has obtained against those of other utilities of comparable size and territory served—may judge its relative position with accuracy.

Contest Is Testing Ground

This contest thus forms a testing ground for *every* utility—offering the chance to submit its work to judges of long experience in electric water heater merchandising.

And *every* utility has an equal chance to win! While the 100,000-meter company may be able to sell many more electric water heaters than the 10,000-meter company, the judges give far more weight to other factors affecting every company.

The basis of judging in this contest, and the relative importance of the various factors are:

FIRST—

A. Excellence of Plan	10%
B. Execution of Plan	40%
C. Effective Use of MKB Material	5%

SECOND—

D. For percentage of sales increase over previous year	15%
E. Number of electric water heaters sold per 1,000 domestic customers	20%
F. For dealer cooperative activities	10%

Send in this Coupon as Your Registration in MKB's 1941 Water Heater Contest

The Modern Kitchen Bureau
420 Lexington Avenue, New York City

Please enter the name of our company to compete in the 1941 Over-all Contest. We will send you our entry not later than midnight, March 1, 1942.

Name .....

Company .....

City .....

State .....

Commercial Electric Cooking Council Meeting

THE Fifth Annual Commercial Electric Cooking Conference was held at the Hotel Knickerbocker, Chicago, on October 9, under the auspices of the Commercial Electric Cooking Council. The largest attendance of utility representatives in the history of the conference indicated the growing interest on the part of utilities in the promotion of commercial electric cooking service. More than 100 guests heard a discussion of problems facing equipment manufacturers, learned the latest thoughts in utility circles on commercial electric cooking sales and servicing, and were told of the effects of the defense program and priorities on the supply and design of equipment.

After the Conference had been opened by Chairman G. B. Koch, Kansas City Power & Light Company, the plans of the Commercial Electric Cooking Council for 1942 were outlined by Paul J. Every, Manager. More promotional materials will be made available for use by utilities, he said, in line with the feeling at the Conference that promotion of the advantages of electric cooking should be continued. Restaurant trade publication editors will be shown the importance of electric cooking equipment as an aid in supplying more nutritious food, and in conserving fuel, labor and expense.

George Ousler, Duquesne Light Company, described the successful record of his company in selling commercial electric cooking service. After pointing out the increased revenues secured through promotion of this business, he emphasized the importance of coordinated direct selling and advertising in securing the best results.

Dr. George W. Allison, Edison Electric Institute, at the luncheon meeting spoke forcefully on the utility's need to continually keep the advantages of its service before the public.

Mr. Koch described the new Uniform Test Data Forms prepared by the Council for collecting data on electric cooking installations in a uniform way. Valuable suggestions were received for securing data, and uses to which they may be put, were secured from the audience during the discussion.

M. H. Hicks, Carolina Power and Light Company, discussed the progress made in selling electric cooking service to hospitals, schools and other institutions. While sales of this type may require more time and work than small counter type installations, he said, once sold they are far less likely to change to other fuels, and such installations carry with them prestige that can be used to good advantage in testimonials, etc.

The problems involved in the servicing of restaurant cooking equipment were the subjects of a talk by A. F. Augustine, Indianapolis Power and Light Company. Pointing out that the first consideration in setting up a servicing policy should be the welfare of the customer, he said that no national rule could be set for every utility to follow. In the discussion that took place, the need for cooperation among utility, manufacturer and dealer in handling servicing was emphasized.

P. M. Alden, Philadelphia Electric Company, told of the need for more facts on the characteristics of commercial cooking load and the customers. He pointed out the wide variation in results being reported by utilities. Tests made by his company on over 75 installations were described, and a summary of the results presented.

George Catlin, Detroit Edison Company, said that industrial expansion due to the defense program has opened new markets for electric cooking. New food serving establishments, enlarging of present locations and the serving of increased numbers of meals, to feed the defense workers give the electric cooking salesman a rare opportunity to increase his sales, Mr. Catlin said.

Mr. I. S. Anoff, Chairman, Food Service Equipment Industries, spoke briefly on the progress made in coordinating the activities of utilities, manufacturers and members of the food service equipment industry.

Appalachian Electric Power Co. Wins Water Systems Contest

THE Rural Service Department of the Appalachian Electric Power Company, Bluefield, West Virginia, Division, receives the First Award of $150 for the best report on the promotion and sales of electric water systems, from February 1 to July 31, 1941, in a contest sponsored by the Electric Water Systems Council. The company's entry was submitted by L. L. Koontz, Rural Supervisor.

Second Award of $75 goes to Wisconsin Electric Power Company, Milwaukee, Wisconsin, whose report was compiled by A. B. Barfield, Rural Sales Supervisor; Third Award of $50 to The Central New York Power Corporation, Syracuse, New York, R. G. Harvey, Rural Service Manager; and the Fourth Award of $25 to Puget Sound Power & Light Company, Seattle, Washington, R. W. Clark, Merchandising Manager.

Reports were judged on the following merit ratings: Comprehensiveness of promotional and sales activities, 60 per cent; cooperation with manufacturers and dealers, 25 per cent; illustrative material, 10 per cent, and clarity of presentation, 5 per cent.

Among the activities of the Appalachian Electric Power Company in its water systems promotion were the use of a display coach and trailer demonstrator; electric water system training schools for dealer salesmen and agricultural agents; continuous direct mail promotion; water system displays and demonstrations at county fair and other meetings; close cooperation with manufacturers and distributors in establishing active water system dealer outlets; the development of a portable low-cost irrigation system, and a cooperative promotion that netted 1.8 electric water system installations per working day.

Wisconsin Electric Power Company activities described in its entry included a long term educational campaign on the advantages of running water for every member of the farm family; a contest in which grade school children throughout the company's territory prepared a scrap book showing how running water can be used to make farm life safer, cleaner and healthier; and the use of a woman rural representative, who shows the Edison Electric Institute's sound-slide film, "Life in the Country," to individual farm families with no attempt being made to sell water systems.

Effective use of Electric Water Systems Council promotional materials was noted in practically every entry received in the contest.

Judges in the contest were Geo. W. Kable, Editor, *Electricity on the Farm*, New York City; H. E. Dexter, Vice-President in Charge of Commercial Relations, Central Hudson Gas & Electric Corporation, Poughkeepsie, New York; and Frank Watts, *Farm Journal & Farmer's Wife*, Philadelphia, Pa.

Power Line Insulators Make Excellent Targets—For Irresponsible Marksmen

By John G. Mock

In The Pittsburgh Press

SPARE the insulators!

"After seemingly endless hours of searching and after some otherwise sweet dispositions were becoming rather strained, the boys located the trouble which was—yes, a broken insulator, which someone so playfully used as a target for rifle practice."

That is the way the Monona County Rural Electric Co-operative, of Onawa, Iowa, reported an interruption in service on its electric lines. It cost $15 to locate the insulator and restore service, to say nothing of the washing machines which lay idle on a busy Monday, the chickbrooders which went cold and no end of general trouble and inconvenience which followed among the farmers.

It may be understood readily and forgiven if the farmers cussed a blue streak while the juice was off. Their remarks when informed of the cause of the trouble probably were rather sulphurous. Most farmers don't like folks who are careless with guns. Especially with farmers who have had their prize stock taken for some sort of game or found their barn doors riddled with bullet holes.

Some Never Grow Up

Of the 7,600,000 licensed hunters in the United States there are comparatively few who are so irresponsible as to start banging away at insulators and other inanimate objects when they get bored with the monotony of hunting and not finding. Nevertheless, there are some who have never grown up; who are rather like the boy who recorded the following short tragedy of boredom in his diary:

"Feb. 26: Got rifle for birthday. Snowing. Couldn't go hunting.

"Feb. 27: Still snowing. Couldn't go hunting.

"Feb. 28: Polished rifle. Still snowing. Couldn't go hunting.

"March 1: Still snowing. Shot Grandma."

There are real sportsmen—hunters who wouldn't think of shooting anything which is sitting still or wearing a red coat.

There are others still who are childish and need to be taught respect for the rights of others.

It is these simple-minded individuals who leave the tell-tale evidence of their maraudings in the pock-marked road markers and signs. Advertising signs riddled with shot-holes are certificates of the presence of such oafs, whose brain-cell probably wouldn't hold a single-kerneled peanut.

In the instance of the insulators—which make such ideal targets for these simpletons—they sometimes show no signs of being harmed until the next storm. Then, in the worst possible weather—usually at night—the whole line goes dead. Linemen must climb poles in the rain, sleet, snow and wind until he locates the damage, for it usually cannot be seen from the ground.

Rig Up Target

One of the ways to break off relations with the farmer is to interfere with his daily routine and that can be done in no better way than to disrupt the service upon which they depend for much of their livelihood.

Boys can't always be expected to use good judgment. But those who haven't had the benefit of instruction can be taught to do their plinking away from telephone and power lines. Better still, let fathers rig up a target which meets with the legal requirements and encourage their sons to take part in this type of healthful recreation with its co-ordination of mind, muscle and eye. In a short time the kids will likely chalk up better scores than their elders and, in addition, an intelligent step will have been taken toward maintenance of the best possible relations with those who provide the hunting for the sportsmen.

As to the peanut-brained individuals, there is only one cure: A healthy slap on that part of the anatomy which harbors the billfold, if there's any billfold there.

A complete list of publications of the Edison Electric Institute and the former National Electric Light Association is available upon request to the Edison Electric Institute, 420 Lexington Avenue, New York, N. Y.

Demand for Handbook on Small Diameter Wire Necessitates Second Printing

THOUSANDS of copies of "Rewiring for Commercial and Industrial Buildings," a handbook on the use of the new small diameter wire recently produced by the Wiring Committee, EEI, have already found their way into the pockets of utility men, contractors, architects and inspectors in every part of the country, and the demand for this booklet has caused a second printing, the Committee announces. Additional copies will soon be ready to fill the orders received.

The booklet covers the use of small diameter wire for rewiring of office and factory buildings, in order to increase capacity of the electrical system, without the expense of replacing existing raceways, rebuilding and redecorating.

Suggestions as to how the utilities may best promote small diameter wire are also given.

The various types of small diameter wire now available and the characteristics of each are described, with the possibilities for the use listed. Diagrams of typical distribution systems, feeder and branch circuits in buildings are shown, with the advantages of each analyzed.

Uninsulated neutral conductors, calculations of voltage drop and conductors in multiple for large capacity are described.

Valuable tabular data is organized in 13 tables. These include tables on current carrying capacity of small diameter wire, circuit lengths for one-volt drop, conduit sizes with number of wires permitted, conduit fills for combinations of wires, and a guide chart for rewiring branch circuits with small diameter wire.

Electrical men interested in wiring activities will find this handbook a valuable reference source for small diameter wire problems of cost, use and promotion encountered in their work every day.

"Rewiring for Commercial and Industrial Buildings" is available from Edison Electric Institute, 420 Lexington Avenue, New York City. Price—one to five copies, 25c; six to 24 copies, 15c; 25 copies and over, 10c.

Rocky Mountain Electrical League Convention

THE Rocky Mountain Electrical League's 38th annual convention held at Estes Park, Colo., September 11-13, was an outstanding success, according to the enthusiastic endorsements of the 250 persons who were present.

Industry members representative of 34 states listened attentively to a dozen able speakers who appealed for new perspectives and urged fresh approaches to old and current problems of merchandising, administrative procedure and public and governmental relations. Advertising was advocated by several of the speakers as one vehicle for creating better understanding on the part of the public.

"Nobody can take this business out of your hands if you do right by it," Gaylord B. Buck, president of the League, declared in his inspirational address to the convention. In that sentence he summed up the essence of the convention, which had as its theme, "planning for the future."

Dr. Adam Bennion, Utah Power and Light Company enumerated three basic problems facing the industry and suggested methods to meet them. How to keep solvent despite pressure of increased costs and taxes on one side, low rates on the other, was first. The threat of government confiscation was the second. Adverse public sentiment to be changed, he declared the third. To remedy these he urged (1) better employee training and service, (2) better job of telling the industry story, (3) more contact with the customers, (4) enlisting support from other businesses similarly threatened, and (5) sitting down with the people in each community and discussing at close range their mutual stake in the issue.

That government planning will not alter human nature, and that after all humans finally get fed up on dictation, regimentation and having their lives planned for them was the reminder left with the convention by W. A. Cyr, *Electrical West*, in telling it to plan for that reaction after the war, and to keep enterprising, exert initiative, and enlist the enthusiasm of youth to the solution of the future's problems.

Manager of parks and improvements of the City of Denver, George Cranmer, told the convention that in his own cost studies he has found that small street lamps are too expensive to use, delivering but 45 lumens per dollar, whereas 16,000 lumen mercury lamps deliver 178 lumens per dollar. Denver's entire street lighting is being modernized progressively. L. A. S. Wood, Westinghouse Electric & Manufacturing Co., Cleveland, had preceded Cranmer, explaining that lighting should not be based on what a town thinks it can afford for lighting but what it really should pay to protect its citizens.

Instead of yielding to the temptation to reduce forces during the emergency, John Louiseau, Public Service Co. of Colorado, advocated increasing personnel and advertising in order to match the army of the forces aligned against the privately owned utilities. With both the defense emergency and the industry's own defense emergency to meet, not less, but more and better trained personnel will be vitally needed.

Honors were accorded Ted M. Foulk, Public Service Co. of Colorado, for meritorious service to the industry during the year, and to George E. Lewis, secretary-manager, because his League won national awards from the Chamber of Commerce of the U. S.

Charter for the newly formed Rocky Mountain chapter of the Illuminating Engineering Society was presented at the special luncheon, Thursday noon, by James M. Ketch, General Electric Co., Lamp Dept., Cleveland, and member of the IES executive council. It was received by R. N. Hankins, Albert Sechrist Co., Denver, chairman of the new chapter. The League's Women's Division also had a meeting, presided over by Mildred Quist, chairman, and addressed by Dr. Allison who presented the new MKB color movie, "It Happened in the Kitchen."

J. W. Alexander, manager of Rawlins Electric Co., Rawlins, Wyoming, was elected president for the next term. T. M. Foulk was elected a vice president.

Wisconsin Association Accounting Convention

ANOTHER annual convention of the Accounting Section, Wisconsin Utilities Association, at Lawsonia, Green Lake, Sept. 12 and 13, sent delegates of electric, gas and transportation companies back to their jobs with new information, more knowledge and with that inherent stimulation which only exchanges of experiences of specialists of different companies provide.

The registration desk recorded 148 delegates and 27 members of the fair sex. This is the largest convention attendance at Lawsonia in the five years accountants held their sessions at this resort hotel.

Subjects presented ranged from effects of war emergency conditions upon financing of new plant, taxes, credit, regulation to an off-the-record disquisition on the development of an industrial jurisprudence by Dr. C. A. Dykstra, president of the University of Wisconsin.

The Section by unanimous vote adopted a resolution urging companies and employees to support the defense saving bond program by the generous purchase of bonds.

H. P. Taylor, Milwaukee, treasurer of the Wisconsin Public Service Corporation, was elected Chairman of the Section. Paul J. Imse, assistant secretary and assistant treasurer, Milwaukee Gas Light Co., was elected vice-chairman.

C. E. Hockings, Appleton, chairman of the Section, opened the convention with an outline of activities during the year and with discriminating expressions of appreciation for managements who had cooperated and for committee members who had worked diligently to prepare reports and discussions.

M. J. Sporrer, Milwaukee, tax expert, Arthur Andersen & Co., reviewed the provisions of federal income tax laws effective during the past twenty years, setting forth details of the burden of taxes upon corporations as indicated by the rates and outlined the provisions of the present federal tax program. He stated that another tax act is in preparation.

Charles W. Wild, president, Ohio Finance Co., presented a highly informative message on "Credit in Today's Emergency." He extolled the regulations restricting consumer credit; he also pointed out their limitations and concluded that what they will accomplish in actual practice remains to be seen.

Wisconsin Electric Section Association Convention

WHATEVER available information that could profitably be used by engineering and commercial forces in these uncertain times was dramatically imparted to more than 450 delegates who attended the convention of the Electric Section of the Wisconsin Utilities Association, Milwaukee, Oct. 13 and 14. Enthusiastic commendation for the program-makers and the entertainment provided was voiced generally.

L. F. Seybold, president of the Wisconsin Utilities Association, announced that a survey just completed indicated clearly that no power shortage existed in the State and that construction programs under way assured more than adequate supplies to the end of 1943.

Commissioner W. F. Whitney, Public Service Commission of Wisconsin, praised companies for their cooperation with the commission in developing the first state-wide power survey in the nation, which survey was later used by the F. P. C. in making regional studies. He asked for intensive efforts to increase efficiencies in operation and management to the end that the status of present rate structures might not be disturbed.

Experiences in dealing with the complexities of obtaining priorities were beneficially exchanged. A comprehensive survey of operating practices of the various companies for the promotion of reliability of service was submitted. Results of increasing capacity of boiler plant equipment without incurring large costs for new equipment were reported.

Commercial sessions were enlivened by excellent presentations of a practical home modernization program; on cooperation with school boards in providing schools with modern equipment; on range selling fundamentals and on new opportunities to promote better lighting.

More than 150 specialists in the lighting, rural, industrial power and home service fields participated actively in discussions arranged for the four round table sessions.

J. A. Tyvand, Racine, chief engineer, Wisconsin Gas & Electric Co., was elected chairman of the Technical Division of the Electric Section, and V. A. Thiemann, Green Bay, assistant chief engineer, Wisconsin Public Service Corp., was elected vice-chairman.

Paul DeLeon, Madison, new business manager, Wisconsin Power & Light Co., was elected chairman of the Commercial Division, and J. H. Dunham, Racine, promotional manager, Wisconsin Gas & Electric Co., was elected vice-chairman.

The retiring chairmen, I. L. Illing and C. F. Dobson, earned the plaudits of the delegates for the program they provided and for their skillfulness in conducting the sessions.

President Seybold, the first speaker on the program, in addition to presenting the power supply situation, stated that companies may be compelled to increase rates as they have been increased in England, if uncontrollable costs of operation are upped much more. He also favored continuation of sales efforts.

With regard to future plans, Mr. Seybold said:

"We must do at least as well in the future as we have in the past. Some study and planning should extend into broader fields than construction of additional capacity—particularly should it concentrate on peak demands. I strongly recommend:

"1. Continued study of industrial loads and their diversity, in order to be in a position to intelligently strive to shift them around the clock so as to improve load factor.

"2. Continued study and rating of all plant including generation, transmission and distribution, in order to determine and record the maximum task each can do in a pinch so that the maximum of kilowatt-hours can be delivered to industry.

"3. Keep up to date on the capacity of facilities and load conditions in neighboring territory in order to determine the usefulness of additional interconnections or the possibility of getting more out of existing interchange agreements." . . .

With respect to the trend of rising operating costs and higher taxes being experienced by electric utility companies, Mr. Seybold said:

"Will we be forced to increase rates in this country as they did in England? If more and more fire under the economic pot finally causes it to boil over, spilling higher costs and higher taxes into our earnings statement, we will reach a climax when the answer to this question must be 'Yes'. Such event would be beyond our control and the answer could not be otherwise even if the utilities achieved perfect performance, which is 100 per cent efficiency. Greater economies in production and operation cannot be achieved by any hocus pocus. Inventive faculty works within the framework of fixed natural laws.

"The fact is that we have come close to the ceiling and it would be misleading to say that future gains in efficiency can equal or even approach the gains of the past. In the lifetime of our industry, the fuel in terms of heat units required to generate a kilowatt-hour has been reduced from about 90,000 B.t.u. to 10,600 B.t.u. If the performance of the past could be repeated in the future, we would soon be generating with negative B.t.u.'s."

C. E. Greenwood, New York, commercial director of the Edison Electric Institute; C. M. Snyder, Bridgeport, Conn., assistant general manager, Appliance and Merchandise Division, General Electric Co. and Fred Eriksen, Milwaukee, chairman of the Advertising Committee, W. U. A., expressed the conviction that without continuation of aggressive business promotion policies, electric companies would not even be trying to maintain their own existence and that of independent appliance dealers, nor would they be carrying out their responsibilities to the public.

They also contended that only through active business promotion could utilities maintain employment and strive to meet their service obligations to their customers and their increased tax obligations to the government.

C. M. Snyder stated that even with shortages of material with which to manufacture appliances and with many brakes placed on consumer buying, 1942 will still present a real job to sell products that are available.

Necessarily, he pointed out, neither his company or other manufacturing companies have curtailed their advertising or sales efforts.

Manufacturers, he said, are first taking care of government defense needs, but they are also expanding their plants to supply necessary civilian needs. In addition, he said, his company is already carrying out a program designed to cushion the usual depression following the defense boom.

Fred E. Eriksen, Milwaukee, chairman of the Advertising Committee, pointed out that during the first World War boom many organizations discontinued advertising on the grounds that unfilled orders for peace-time commodities and full-peak production of war orders had eliminated the necessity of keeping their names before the consuming public.

"They never did get started again when the war was ended and when Washington contracts stopped so bluntly and cruelly," Mr. Eriksen said. Continuing, he said: "We, in the utility business, are in the same boat. We, too, have 'war business,' plenty of extra volume business, with more in the offing. But we, too, have built up customer good will and acceptance. Through the years we have acquired tremendous cumulative values in making our customers electrically minded. Our customers like and want our commodity—low cost electricity.

(*Continued on page* 436)

PRIZE AWARDS IN 1942

Administered by Edison Electric Institute

The Prize Awards Committee of the Edison Electric Institute is pleased to announce the following prize awards, offered for open competition by all electric light and power companies in the United States, or by employees of the companies. Closing date for entries in the several contests is April 1, 1942. Please note that most awards cover acts or accomplishments occurring during the calendar year 1941. Detailed information on each of the awards may be obtained from the Secretary of the Edison Electric Institute, 420 Lexington Ave., New York, N. Y.

Of Interest to Chief Executives

CHARLES A. COFFIN AWARD—Advancement in Operation and Plant

A gold medal, known as the Charles A. Coffin Medal, donated by General Electric Company, is offered for the year 1941 to the public utility operating company, within the United States, which has achieved the greatest advancement in its operations and physical plant, thereby making a distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry. The company awarded the medal will also receive $1,000 for its employees' benefit or similar fund.

THOMAS W. MARTIN AWARD—Rural Electrification

A bronze plaque is offered by Mr. Thomas W. Martin, President, Alabama Power Company, to the public utility operating company within the United States which during the year 1941 has shown the greatest contribution to agricultural advancement within the company's territory through promotion of uses of electricity, development of rural load, cooperation with other agencies, extension of rural lines, organization and planning for development of rural electrification.

CLAUDE L. MATTHEWS AWARDS—For Valor

For acts of devotion to duty by public utility company employees wherein outstanding courage has been shown in efforts to maintain important electric service or to restore service in the shortest possible time, three cash awards of $150 each are offered for the year 1941 by Mr. Claude L. Matthews, Vice President, W. N. Matthews Corporation. A citation and an appropriate lapel decoration will accompany each cash award.

Recommendation for the award must be submitted by the President or acting executive head of the company in which the person recommended is or was employed, and it is urged that such recommendation be submitted as soon as convenient after occurrence of the act of valor.

Of Interest to Sales Executives

AUGUSTUS D. CURTIS AWARD—Lighting of Commercial Buildings

Certificates and cash prizes, donated by Messrs. Darwin Curtis and Kenneth Curtis of Curtis Lighting, Incorporated, in memory of Augustus D. Curtis, are offered for distinguished contributions by public utility operating companies toward the advancement of higher levels of illumination in the interiors of commercial buildings during the twelve months ending March 1, 1942. First prize: a certificate to the winning company and $200 to the individual responsible for the achievement. Second prize: a certificate to the company and $100 to the individual responsible. Third prize: $50 to the individual responsible for the achievement. Fourth prize: $25 to the individual responsible for the achievement.

GEORGE A. HUGHES AWARD—Domestic Electric Cooking Load

Three prizes are offered by Mr. George A. Hughes, Chairman, Edison General Electric Appliance Company, Inc., for distinguished contributions made during 1941 by public utility operating companies within the United States to the development of the market for electric ranges through direct or cooperative promotion or selling, or both. First prize: to the company, a trophy; to the individual or individuals responsible, $500. Second prize: to the company, a certificate of recognition; to the individual or individuals responsible, $300. Third prize: to the company, a certificate of recognition; to the individual or individuals responsible, $200.

LAURA McCALL AWARD—Achievements of Home Service Departments

An engraved plaque, two illuminated parchments and a total of $175 in cash, donated by McCall's Magazine in memory of Laura McCall, are offered for outstanding achievements by the Home Service departments of operating public utility companies in the advancement of electrical living in the home through the promotion of electrical appliances and home lighting equipment. Companies winning first, second and third prizes will receive, respectively, the plaque and the parchments; the Home Service Directors or the directing heads of the Home Service departments reporting the achievements will receive the three cash prizes, which are $100, $50 and $25. The contest period is the calendar year 1941.

Of Interest to Engineers

McGRAW PRIZES . . . . . Engineering

Cash prizes of $250, $150 and $100 donated by Mr. James H. McGraw, Honorary Chairman, McGraw-Hill Publishing Company, are offered for the three most meritorious papers submitted on any Engineering or Technical Subject relating to the Electric Light and Power Industry.

Leaflets covering the McGraw prizes are available. Executives are invited to request from the Secretary of the Institute copies for distribution to members of engineering staffs.

All papers, exhibits or statements submitted in competition for the 1942 prizes must be forwarded to the Secretary, Edison Electric Institute, 420 Lexington Avenue, New York, N. Y., by April 1, 1942.

All prizes will be announced and awarded at the 1942 convention of the Edison Electric Institute.

PRIZE AWARDS COMMITTEE

H. P. Liversidge, *Chairman*
Charles W. Kellogg
James E. Davidson
Lewis B. Beatty, *Secretary*

PERSONALS

Rating as one of the oldest employees of the company in point of service, THOMAS W. MARTIN, president of the Alabama Power Company, was recently presented with a 30-year service button. The presentation, made by J. M. Barry, vice-president and general manager, took place after President Martin had awarded service emblems to a number of other company employees in Birmingham. Mr. Martin has been president of the company since 1920 and prior to that he was vice-president for five years. He went with the company in 1912 as general counsel.

GEORGE S. WHITLOW has entered the electrical engineering department of the Union Electric Co. of Missouri, St. Louis, in the capacity of electrical engineer. Following graduation from the University of Arkansas in 1924, Mr. Whitlow joined the General Electric Company, serving with distinction in Schenectady, Philadelphia and, for the past twelve years, in St. Louis as central station application engineer. He has performed engineering services for numerous power companies and large industrial organizations in Arkansas, Missouri, Illinois and western Tennessee. He is a member of the American Institute of Electrical Engineers.

CHARLES E. FAHRNEY, for sixteen years division manager of the southern division of the Oklahoma Gas and Electric Co., with headquarters at Ardmore, has retired in order to devote his entire time to personal business interests. HENRY E. BOWEN, northern division manager, was named to succeed him. E. B. SMITH, central division manager, was transferred to Enid as manager of the northern division, while LEO A. WHITE, central division superintendent, was promoted to the position of central division manager. As a tribute to Mr. Fahrney, at his retirement, more than 100 members entertained with a farewell party in his honor.

Retirement of EDWARD A. WAKEMAN as vice-president, Wilkes-Barre Division of the Pennsylvania Power and Light Company, has been announced. Mr. Wakeman has been a vice-president since 1936 and has been associated with the public utility business in the city of Wilkes-Barre and the Wyoming Valley for more than 31 years. Mr. Wakeman's retirement comes after 53 years of service in the utility industry, covering practically all of his business life.

Mr. Wakeman's duties will be assumed by FRANK C. MUELLER, division manager, who has been Mr. Wakeman's assistant. Mr. Mueller entered the employ of the Pennsylvania Power and Light Company, following graduation from Stevens Institute of Technology in 1924, and since that time he has occupied various positions in an executive capacity, having served as manager of certain of the company's smaller districts until 1935 when he was put in charge of the Hazleton division of the company. He was transferred to Wilkes-Barre as Mr. Wakeman's assistant in the early part of 1940.

C. H. LEVEE, formerly connected with the Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y., is now with Ford, Bacon and Davis, Inc., at Little Rock, Ark., as electrical engineer.

OLIN H. RIRIE, formerly assistant personnel director, has assumed the duties of manager of the southern division of the Utah Power and Light Company, with headquarters at American Fork. He succeeds R. E. BAILEY, who has been granted a leave of absence because of illness.

M. L. ROACH has been appointed electric superintendent (acting), Delaware division, Philadelphia Electric Company, during the absence of J. W. BUXTON, who was called into military service and M. S. JOLLEY has been appointed electric superintendent, Main Line division, during the absence of L. G. WITMER, called for military service. W. F. ROTH has been appointed electric superintendent, eastern division, to succeed G. H. KNOUSE, transferred to the engineering division, transmission and distribution department, as senior engineer. R. L. COLE has been transferred to the engineering staff of the general superintendent's office, transmission and distribution department. He was formerly appliance service superintendent in Norristown.

W. R. Ross has been named superintendent of the underground section of the Philadelphia division. He has served as designer of switchboard construction, assistant electrical engineer, assistant engineer, and superintendent of overhead-underground lines in Philadelphia. CHESTER W. ILES has been appointed electric superintendent (acting), Schuylkill division, to succeed the late R. G. STAFFORD.

L. F. SEYBOLD, vice-president of the Wisconsin Electric Power Company and president of the Wisconsin Utilities Association, has been named to represent public utilities on a recently organized Wisconsin committee to help promote the sale of defense bonds.

MARVIN BELANGIE of Butte, Mont., has been appointed as district manager at Coeur d'Alene of the Montana Power Co., succeeding the late E. S. Peel. Mr. Belangie has been connected with the power company since his graduation from the University of Montana.

R. N. MOORE of Canton, Ohio, has been named superintendent of the Lima district of the Ohio Power Company to succeed the late L. A. Wagoner, who was killed in an automobile accident. Mr. Moore was commercial department manager at Lima prior to his transfer to a similar position in Canton last July.

J. O. HENKEL, who was recently elected a vice-president of the Alabama Power Company, has been appointed director of personnel and safety. J. O. SPEED has been made manager of safety.

FRANK WALSH, formerly northwest division manager, Puget Sound Power and Light Company, Bellingham, Wash., has been transferred to the managership of the central division of the company, with headquarters at Seattle. He has been with the company since 1912.

BASCOM B. RIGGS, formerly manager of the Western Grove district for the Arkansas Power and Light Company, has been named rural lines supervisor at Harrison and SAMUEL COVINGTON of the Harrison service department, has been made manager of the Western Grove district.

E.E.I. PUBLICATIONS AND PROMOTIONAL MATERIAL

(Prices include transportation in U. S. only. Please order by number shown before title. Standing Orders may be placed for a specified number of copies of reports of various committees as issued, to be shipped to one address.)

Payable in United States Currency—Postage Stamps Not Acceptable

Accounting and Statistical

	Members	Non Members
Accounting		
Digest of Authoritative Opinions of the Definition of Original Cost (Including Appendix on "Prudent Investment") 1938	$1.50	$1.50
Proceedings—National Accounting Conferences		
Complete Set—5th Conference 1941	2.00	2.00
" " 4th " 1940	2.00	2.00
" " 3rd " 1939	2.00	2.00
" " 2nd " 1938	1.50	1.50
by Groups Yearly—		
Classification of Accounts	.50	.00
Customer's Relation	.50	.50
Depreciation	.50	.50
Plant Accounting and Records	.50	.50
Purchasing Stores & Transportation	.50	.50
General Sessions	.50	.50
Summary of Definitions Covering Depreciation and Related Terms 1939	1.00	1.00
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H-2 Electric Light and Power Industry in 1939 (3/40)	.30	.75
(Statistical Bulletins also available for years 1932 to 1938 inclusive) each.	.30	.75
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Engineering Committees

ACCIDENT PREVENTION—RESUSCITATION

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	10— 99 "	.08 "	
	100—499 "	.06 "	
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	10,000	50.	
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	Members	Non Members
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H-8—Standard Basic Impulse Insulation Levels — AIEE - EEI - NEMA (1/41)	.05	.05
H-3—Inductive Coordination Aspects of Petersen Coil Grounding—Engr. Report No. 42—Joint Subcommittee on Development and Research (12/40)	.25	.65
H-1—Test Specifications for Household Electric Ranges—EEI-NEMA (5/40)	.20	.50
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G-6—Standards for Distribution Transformers—EEI-NEMA (2/40)	.25	.60
F-17—Short-Circuiting Relay Protectors—Engr. Report No. 41—Joint Subcommittee on Development and Research (8/38)	.40	1.00
F-8—Test Specifications, Automatic Electric Storage Water Heaters—EEI-NEMA (10/38)	.20	.50
F-2—Inductive Coordination of Rural Power and Telephone Systems—Engr. Report No. 40—Joint Subcommittee on Development and Research (1/38)	.80	2.00
E-12—Resuscitation Booklets — EEI-AGA (7/37)	.10	.10
E-9—Characteristics of Power System Faults to Ground-Engr. Report No. 39—Joint Subcommittee on Development and Research (11/37)	.60	1.50
E-5—Principles and Practices for Inductive Coordination, EEI-AAR (1/37)	no charge	no charge
E-4—Joint Use of Poles 6.6 and 13.2 kv, Safety Features—EEI-Bell Tel. (1/37)	.30	.75
E-3—Jointly Used Wood Pole Lines Specifications—EEI-Bell Tel. (1/37)	.50	1.50
Power Level and Sensitivity of Telephone Circuits—Engr. Report No. 38—Joint Subcommittee on Development and Research (1936)	.40	1.00
Computation of Zero-Sequence Impedance of Power Lines and Cables—Engr. Report. No. 37—Joint Subcommittee on Development and Research (1936)	.80	2.00
Selected Devices for Reducing Harmonics in Power Systems—Part II—A-C Systems—Engr. Report No. 34—Joint Subcommittee on Development and Research (1936)	.80	2.00
D-14—Vol. IV—Engineering Reports of the Joint Subcommittee on Development and Research (1/37)	5.00	10.00
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F-12—Combustion, 1938 (11/38)	1.00	2.50
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(Air conditioning installation reports also available for 1934-35-36)		
Lighting		
Typical Promotional Programs — Home Lighting Equipment (1941)	.35	
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Storm Loading and Strength of Wood Pole Lines and a Study of Wind Gusts (1936)	$2.00	5.00

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	Members	Non Members
Better Light—Better Sight News (9 issues yearly)	.75	.75
Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Modern Kitchen Bureau News (Bi-Monthly)	Free	Free
Rural Electrification Exchange (Quarterly)	.50	1.00

ORDERS SHOULD BE ADDRESSED TO

EDISON ELECTRIC INSTITUTE 420 Lexington Ave., New York, N. Y.

Utility Operating History in First World War

(Continued from page 399)

higher operating costs. However, unless such expenses are now controlled with great firmness, net income and available cash will be vastly diminished.

The expansion imposed upon utilities, being converted from a peace-time enterprise to a war-time industry, requires large sums of cash. Experience and interpretation of news releases of the Federal regulatory authorities indicate that sources of new money for utilities are being dried up by extensive regulation and restrictions, causing very expensive and unwarranted delays in obtaining consent to finance. Regardless of how essential the need for funds may be, it appears that regulatory authorities are not relinquishing or relaxing power to regulate even in a period of national emergency. In the 1917-18 emergency it was the high cost of money, not government regulation, that presented the principal barrier to obtaining funds.

As a result of the restrictions now imposed on securing funds, it would seem that managers of utilities have a paramount obligation to customers, employees and stockholders to keep their companies in a strong cash position.

Summary

The lack of transportation contributed largely to the shortage of fuel as well as supplies during the First World War. At present it does not seem likely that there will be a shortage of transportation facilities but the same forces are at work now that brought about trouble in the past. Many agencies can affect transportation, the mining of coal and production of fuel oil. Experience has taught what signals to look out for. There must be no repetition of the fiasco of 1918.

Discretion should now be exercised in the use of copper, cable and line material and it would seem prudent to try in some measure, at least, to hold stocks on hand for necessary maintenance and repairs, ordering through the use of the priority machinery as much material as may be needed for defense construction.

Labor and material costs in 1917-18 rose to levels theretofore unknown. Deliveries of materials were placed well into the future. Taxes were thought to have reached the ceiling and net earnings showed sharp declines.

In the last few months of the present emergency labor costs have advanced rapidly and all signs point to further social and inflationary levels. Deliveries of materials are slowing up and are being placed under priority control and in the near future it is expected that supplies will be most difficult to obtain. Today taxes are the highest in the history of the country and there is talk of still higher levels.

The present downward trend of net earnings can be arrested, at least in part, by solicitation of the assistance of every employee in eliminating many items of expense. Controllable expense items of every nature not essential in the public interest should be eliminated.

Rates were the subject of many conferences between executives and regulatory authorities in 1918 and applications to raise rates, and rate cases were numerous. Carefully designed flexible rate clauses should be put in operation where applicable to avoid a repetition of the 1918 conditions in this respect.

In the First World War companies having strong cash balances were not perturbed, except about shortages of fuel and supplies. In the depression years of

the early thirties prudent operators were conscious of their strength when they had ample cash resources and the executive who now provides his company with cash by reductions in operating expenses and curtailment of construction will be less likely to feel the pinch when the emergency becomes more severe.

"Business as usual" is out. It is easy to say this. It is harder to visualize what it means in *practice*. But the suggestion is offered that the earlier the truth of that statement is realized, and the earlier specific plans are made to adapt to the new and controlling emergency conditions now prevalent, the easier will be the transition and the greater the chances for avoidance of subsequent drastic results.

Wisconsin Convention

(*Continued from page* 431)

"We must, and can, through advertising, keep them liking and wanting electricity so that when Hitler starts hiking and Mussolini knows he has muffed, our customers, and particularly residential customers, will be in a receptive mood to use still more electricity."

G. V. Rork, Eau Claire, president, Northern States Power Co., stressed the fact that farm income is the most important element to be considered in rural electrification activities. He advocated greater standardization in construction, services and rates. He opposed reducing construction standards and emphasized the need for maintaining service reliability. He declared that much more information was needed on outages. He urged more intensive selling efforts in rural areas.

O. P. Cleaver, Bloomfield, N. J., lamp division, Westinghouse Co., dramatically demonstrated new opportunities to sell better lighting and pointed out the need for training salesmen to take advantage of new lighting developments so as to enable them to guide the public properly. He urged active efforts in selling protective lighting to industrial plants engaged in defense production and mentioned that the F. B. I. offices would aid.

Dr. Charles J. Miller, Jr., Ohio Brass Co., Columbus, demonstrated suppression of radio interference from insulators and line hardware. T. J. Bailey, chairman of the Radio Coordination Committee, reported that interference caused by electric lines was decreasing continuously. L. C. Blevins, manager, meter sales section, Westinghouse Co., described the priorities situation with reference to meters. G. G. Post, Wisconsin Electric Power Co., lead discussions on the general priority problem.

Theron Brown, Madison, chairman of the Service Operations Committee, presented the first survey ever made on operating practices of the different companies for the promotion of service reliability.

P. A. Peterson, La Crosse, set forth the operating features obtained in banking distribution transformers on 115/230 volt, single phase systems.

F. W. Deterling, Eau Claire, reported on the progress made in analyzing data compiled in a study of flow waves on rivers. He said the Hydro Committee expected to complete its report by spring of 1942.

L. W. Wyss, Iron Mountain, presented tables which can be used to ascertain the average voltage dips caused by welders of five classifications.

M. E. Fitze, Milwaukee, reported that the steam sub-committee has spent its time so far this season on a consideration of the problem of "Increasing Capacity of Existing Boiler Plant Equipment."

CONVENTIONS AND MEETINGS

OCTOBER

2	Meter and Service Committee, EEI, New Ocean House, Swampscott, Mass.
6-7	Prime Movers Committee, Hotel Statler, St. Louis, Mo.
6-8	National Electrical Contractors Association, Rice Hotel, Houston, Texas
6-10	National Safety Council's 1941 Congress and Exposition, Stevens Hotel, Chicago, Ill.
8-10	**American Institute of Electrical Engineers, Coronado Hotel, St. Louis, Mo.**
9	Commercial Electric Cooking Council Conference, Knickerbocker Hotel, Chicago, Ill.
12-15	American Society of Mechanical Engineers, Louisville, Ky.
13-14	Electrical Equipment Committee, EEI, Hotel Cleveland, Cleveland, Ohio
13-14	**Wisconsin Utilities Association, Commercial and Technical Sections, Schroeder Hotel, Milwaukee, Wis.**
14-17	National Electrical Wholesalers Association, Hotel Statler, Detroit, Mich.
19-24	American Welding Society, Bellevue Stratford Hotel, Philadelphia, Pa.
20-22	Transmission and Distribution Committee, EEI, Netherland Plaza Hotel, Cincinnati, Ohio.
20-22	American Gas Association, Atlantic City, N. J.
27-28	Accident Prevention Committee, EEI Headquarters, New York, N. Y.
27-31	National Electrical Manufacturers Association, Waldorf-Astoria Hotel, New York, N. Y.

DECEMBER

3-5	Congress of American Industry of the National Association of Manufacturers, Waldorf-Astoria Hotel, New York, N. Y.
3-5	American Institute of Electrical Engineers, Southeastern District, St. Charles Hotel, New Orleans, La.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of EDISON ELECTRIC INSTITUTE BULLETIN, published monthly at Philadelphia, Pa., for October 1, 1941.

State of New York.
County of New York.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the EDISON ELECTRIC INSTITUTE BULLETIN, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management . . . etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations . . . to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are: Publisher, EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City; Managing Editor, none: Business Manager, none.

2. That the owners are EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City, a mutual organization, not incorporated; Charles W. Kellogg, President, New York, N. Y.; J. C. Leighton, Treasurer, New York, N. Y.; H. S. Bennion, Vice President and Managing Director, New York, N. Y.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

WILGAR COLEMAN,
Editor.

Sworn to and subscribed before me this 18th day of September, 1941.

(Seal)
MAE B. WOODS,
Notary Public, Queens County.
(My commission expires March 30, 1942)

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H. HOBART PORTER.....American Water Works & Electric Company, Inc., New York, N. Y.
HERBERT A. WAGNER.....Consolidated Gas, Electric Light & Power Company of Baltimore, Baltimore, Md.
JUSTIN R. WHITING.....The Commonwealth & Southern Corporation, New York, N. Y.

(Terms expiring 1943)

PHILIP G. GOSSLER.....Columbia Gas & Electric Corporation, New York, N. Y.
H. P. LIVERSIDGE.....Philadelphia Electric Company, Philadelphia, Pa.
WILLIAM MCCLELLAN.....Union Electric Company of Missouri, St. Louis, Mo.
K. M. ROBINSON.....The Washington Water Power Company, Seattle, Wash.
P. L. SMITH.....Middle West Corporation, Chicago, Ill.
GEORGE N. TIDD.....American Gas & Electric Company, New York, N. Y.
JOHN E. ZIMMERMANN.....The United Gas Improvement Company, Philadelphia, Pa.

(Terms expiring 1944)

D. C. BARNES.....Engineers Public Service Company, New York, N. Y.
SAMUEL FERGUSON.....The Hartford Electric Light Company, Hartford, Conn.
P. H. GADSDEN.....The United Gas Improvement Company, Philadelphia, Pa.
C. E. GROESBECK.....Electric Bond and Share Company, New York, N. Y.
W. J. HAGENAH.....Public Utility Engineering & Service Corp., Chicago, Ill.
EDWARD REYNOLDS.....Columbia Gas & Electric Corporation, New York, N. Y.
A. H. SCHOELLKOPF.....Niagara Hudson Power Corporation, New York, N. Y.
E. W. WAKELEE.....Public Service Corporation of New Jersey, Newark, N. J.